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THE COVER: Republic Thunderjets, 600 m.p.h. Air Force fighters. (See article on page 22.)

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FLYING

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THE MAIL BOX

FOR THE MAHARAJ

We are interested in details on the *Aero-Commander*, new twin-engined executive plane shown in "Have You Seen"

. . . in the formative stage.

[July FLYING]. Do you have detailed information?

The Secretary to
THE MAHARAJ KUMAR SAHIB BIKANER
Lallgarh Palace
Bikaner (Rajputana)
India

● Production plans for the Aero-Commander are still in the formative stage, and it is not known how soon models will become available. Flight test data on the plane (which will sell for somewhat less than $30,000) is not yet exact. It will, however, cruise at approximately 170 m.p.h., and gross weight will be at least 4,400 pounds, allowing full fuel for an 850-mile range, five passengers and baggage. Aero Design and Engineering Corp. is located at Culver City, Calif.—ED.

YOUNG CO-PILOT

I read recently that Northwest Airlines has an 18-year-old co-pilot. How could he accumulate enough flight hours to meet airline qualifications? Are airlines employing co-pilots that young?

BRUNO W. MATUSZAK
Medford, Ore.

● Co-pilot Jim Freeburg (whose father, Capt. Mal Freeburg, has been with Northwest Airlines 20 years) has flown for several years, has accumulated a substantial number of flight hours and has an instrument rating. Northwest Airlines reports: ". . . to become a full-fledged pilot or captain is something else again, involving very stringent requirements of Government and the airlines themselves. We would like to point out that this is an exceptional case (hiring an 18-year-old co-pilot) and generally most co-pilots are in their early twenties or a bit older when hired."—ED.

TAIL-LESS ROADABLE

As Inventor Bill Stout says, most inventions come from piecing together a group of old ideas into a new form for a new function. There is little that is really new. The first tail-less airplane was built in England by Dunne . . . and it was built under license in this country by W. Starling Burgess, the yacht builder, as the "Burgess-Dunne," at Marblehead, Mass. The Northrop flying wing is a direct descendant. I have long wondered why important airplane builders have shied away from the tail-less in the meantime.

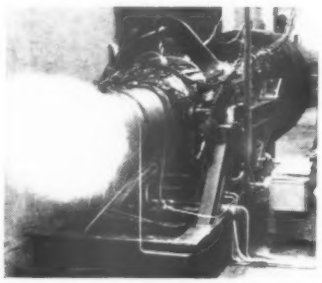
Waterman combined the tail-less sweepback with the roadable idea and had three of them at the Cleveland Air Show in about 1937. The tail-less should be the logical approach to the roadable plane, first because it eliminates the tail which is awkward in a roadable and, since a tail-less must have extreme sweepback, inherent stability is easy to achieve on both the logitudinal and lateral axis. And second, add flaps and the landing speed is reduced, a desirable characteristic in a roadable, which, presumably, is to have a broad appeal to the common man.

So in the tail-less design we have sweepback (and washout) for inherent stability and simplified control, we have eliminated the tail for better roadable design conversion, and have added landing flaps for slow landings—a happy combination all told. Incidentally, we also have excellent forward and side visibility with the sweepback—a feature which Mr. Stout deems highly desirable. . .

R. H. PEARSON
Quincy, Ill.

TURBOJET ENGINE

After reading about the high fuel consumption of jet aircraft [Jets for Civil Planes?, December FLYING], I'd like to know what happened to Lockheed's XJ-



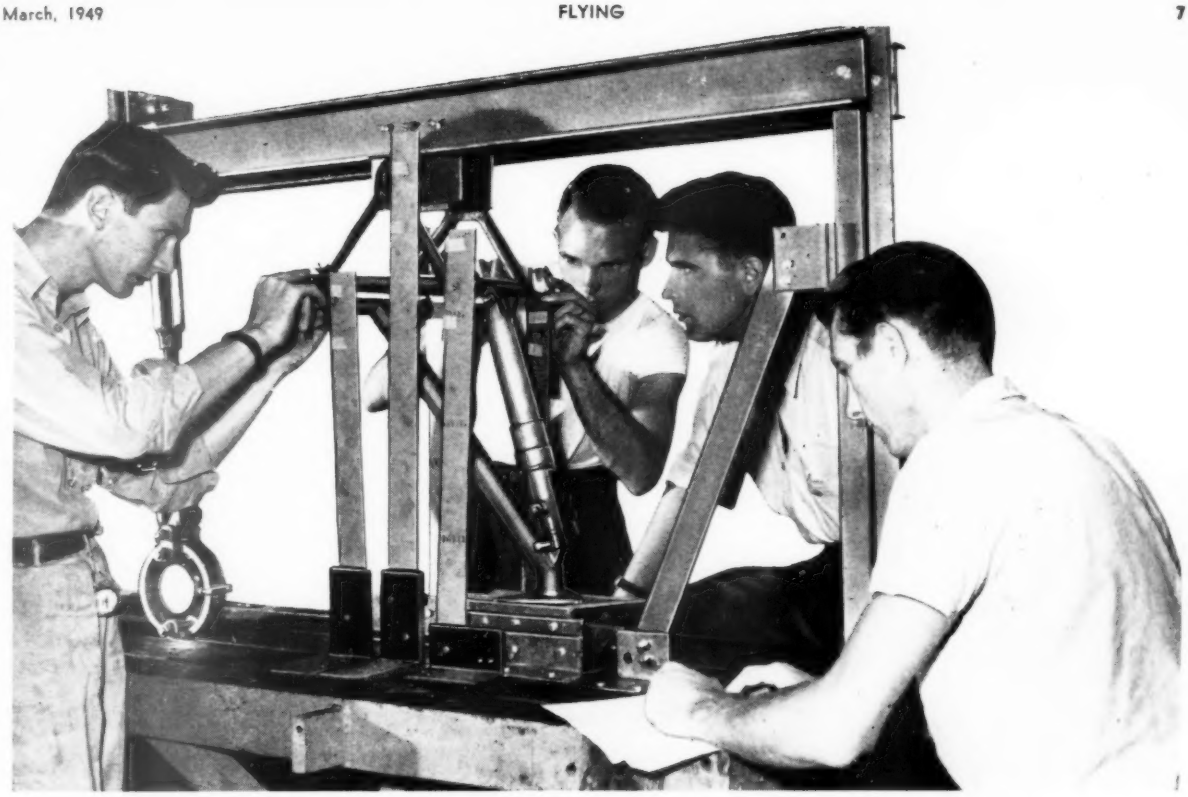
. . . for further testing.

37 turbojet engine. As I recall, this engine had amazingly low fuel consumption due to a high degree of thermal efficiency.

ARTHUR E. KEELER
Peekskill, N. Y.

● This engine has been moved to Wright Aeronautical Corp., Wood-Ridge, N. J., for further testing and development under Air Force contracts.—ED.

(*Continued on page* 81)



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NOSE WHEEL ASSEMBLY GETS A BRAKE

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▶ This test of the nose wheel strut assembly is a typical example of the practical "test lab" work that makes *Northrop* training parallel the aircraft industry's actual engineering methods.

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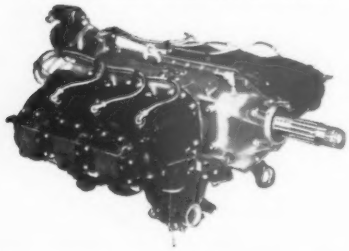


Continental Motors Corp.
MUSKEGON, MICHIGAN

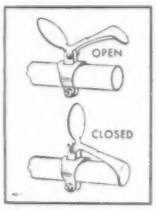
CONTINENTAL
Red Seal
ENGINES

NOTES ON CIVIL FLYING

. . . **The CAA-developed "slope line"** system of airport approach lights has been approved as standard by an Army-Naval-Civil committee, and will be installed soon on eight airports. The lights are placed in such a position that the pilot sees a "funnel" of two rows of light leading to the end of the runway when he is on the correct approach path, and other typical patterns when he is off to right or left, or too high or too low.

. . . **Cross-wind gear** helps planes take off faster and in less distance with side winds than they do in still air, NACA recently reported. In a 90° cross-wind a lightplane used 75 feet less runway on take-off than under calm air conditions.

. . . **An automatic pitot protector** has been developed by E. H. Strong of Strong's Flight Service, Pearsall, Tex. The closure opens automatically when the plane reaches 31 m.p.h. and closes automatically when speed falls below 31 m.p.h. Retail price is $1.75.



. . . **Polarizing sun glasses** can be "hazardous and distracting" to pilots wearing them, CAA Medical Research Laboratory reports. Glasses which polarize light cause the appearance of numerous dark areas in certain types of windshields. Sometimes they resemble large-screen mesh; in other cases they form parallel light and dark areas. Visibility is greatly reduced.

. . . **A new manual-selective device,** called the Strato-Cruise Control, has been applied to Aeromatic propellers and is now in production. The control is a mechanical linkage supplementing, at will, the automatic operation of the prop to provide the selectivity of engine speed requested by many pilots.

. . . **The World Aviation Missionary Aviation Council** has been formed to hasten world evangelization by assisting and advising missionaries and missionary organizations operating airplanes.

. . . **CAB** has authorized All American Airways to suspend pick-up mail service over its Route 49, involving 1,500 miles of routes radiating out of Pittsburgh, Pa., to Cincinnati, O., Jamestown, N. Y., and Williamsport, Pa. Regular passenger and mail service on several routes was authorized.

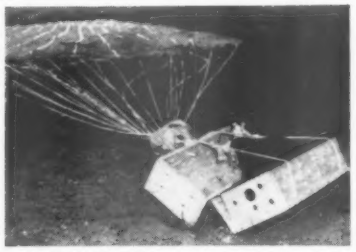
. . . **Atlantic Aviation Service,** New Castle County Airport, Wilmington, Del., has equipped a panel truck with a complete line of aircraft parts and equipment for on the spot delivery to airports in Delaware, New Jersey, Eastern Pennsylvania, Maryland, and northern Virginia.

. . . **A "tadpole" wing** is being developed by the Australian Council for Scientific and Industrial Research. The wing incorporates boundary layer suction and is designed to be fitted to a standard DeHavilland DH-G2 six-passenger glider. The wing is thick and has a series of suction slots located at a point where the laminar airflow normally breaks away from the wing.

. . . **The world pattern** of radio frequency allotment must be redrafted because of the continuing growth of international air travel which has increased the need for communications between air and ground and ground and air. A new plan has been prepared by ICAO.

. . . **The first engine analyzer** for scheduled-flight use has been installed in a Pan American World Airways *Connie* and is now in transatlantic service.

. . . **Year-end Notes.** There were 97,619 registered civil aircraft in the United States on August 1 . . . More than 4,000 air markers were installed in 1947 and 1948, making about 5,000 now serviceable . . . Airports increased from 5,431 in 1947 to 6,324 at the end of 1948 . . . Airlines had their fourth safest year in history with a fatality rate of 1.41 per 100,000,000 passenger miles compared with 3.2 in 1947 . . . They probably lost about $6,700,000 compared with nearly $22,000,000 the year before . . .



Not-so-eager beavers are parachuted in boxes to restock Idaho primitive areas. Boxes open up automatically.

. . . **The Bell X-1,** with Capt. Charles E. Yeager at the controls, set a new rate-of-climb record of 13,000 feet per minute from take-off. The X-1 made its first ground take-off on the record hop.

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- Paul Mantz — *Motion Picture Pilot and 3-Time-Winner Bendix Air Race*
- Ted W. Lawson — *Author of "30 Seconds Over Tokio"*
- Douglas Shearer — *Director of Recording M-G-M Studios*
- Vern L. Tyler — *Director, Santa Monica Municipal Airport*
- Mark T. Gates — *Mayor of Santa Monica, Calif.*
- Esther Williams — *Movie and Swimming Star*
- George S. Oberdorf — *Exec. V. P. Clover Leaf Aviation*
- Donald Douglas Jr — *Douglas Aircraft*

The only requirement is that the finalists be physically qualified to hold a Student Pilot's License under C. A. A. regulations. Penmanship, grammar, or spelling will not count in making final selections. Contest closes June 30, 1949.

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MILITARY NEWS

. . . **Air National Guard** has 2,100 planes (including 1,700 tactical aircraft and 75 F-80s) compared with fewer than 300 observation-type craft allotted air units before World War II. Air Guard strength at year's end was 34,981—about 60 percent of total allotted M-Day personnel.

. . . **Fifty Stratofreighters** (C-97s) will be built by Boeing for the Air Force, giving the air arm a total of 60 giant double-deck transports. These planes are capable of carrying as much freight as 210 C-54s.

. . . **Jet airliner,** Britain's DeHavilland 106 should be in commercial operation by 1951 or 1952, English sources believe. The DH-106 is designed to carry 40 passengers on six-hour transatlantic hops at approximately 50,000 feet.

. . . **Small businesses** (companies with fewer than 500 employees) received about 50 per cent of all Air Force purchase contracts during the last half of 1948.

. . . **New aptitude test,** called the Airmen's Classification Test, has been devised by the Air Force to measure enlistee's aptitudes for various occupational skills. The new test (requiring two days for completion) will replace World War II's Army General Classification Test.

. . . **Navy's GCA school** at Olathe (Kan.) Naval Air Station is training Air Force Controllers and GCA teams in Ground Controlled Approach. These crews will be used on the Berlin Air Lift.

. . . **More AF cadets** will be trained in 1949 than in any previous peacetime year. Number of classes has been increased from three to eight per year, but the size of each class has been reduced to allow more efficient use of personnel and aircraft. Cadet training will be given at eight Air Force Bases this spring.

. . . **A flying repair shop** installed in a C-54 makes monthly inspection trips to Air Force missions in Central and South America. Use of the C-54 cuts Air Force maintenance costs by eliminating need for special crews being dispatched to outposts.

. . . **Lieut. Gen. Elwood R. Quesada,** new head of the Air Force Reserve, recently conducted an inspection trip to several southeastern U.S. Air National Guard and Air Force Reserve units. He was accompanied by Cornelius V. Whitney, Assistant Secretary of the Air Force. General Quesada is expected to strengthen the Air Reserve program. [See "Paper Air Force," page 20.]

. . . **One hundred C-46s,** now stored at Walnut Ridge, Ark., will be re-conditioned by Grand Central Airport Company at Glendale, Calif. Grand Central received the $2,500,000 contract, after completing a similar contract calling for overhaul of 100 C-46 planes for the Chinese Air Force.

. . . **Surplus electronic equipment,** including radio and radar receiver and transmitter equipment, will be delivered to Air National Guard units by War Assets Adminstration.

. . . **Italian Air Force,** restricted by peace treaty to 350 craft, has ordered new turbo-jet training planes.

Round-the-clock operation at Fort Worth enabled Convair to deliver 12 B-36s to Air Force at year's end, eliminating overtime work and putting production on schedule as 1949 began.

Extra Service Goes a Long Way—in Private Flying

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Cities Service Cisco Solvent engine cleaner

Cities Service Aero Greases and aviation specialty lubricants

CITIES SERVICE

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AOPA Is World's Finest Says "Good Neighbor" Pilot D. B. Simmons

"Your organization is one of the finest in the world, and I only wish we had one as strong in Canada. You may rest assured that I will do all I can to enroll more members from my end of the country. Only by the concentrated efforts and full cooperation of all pilots and operators can we make flying the respected and worthy business and sport it has the right to be. I wish you continued success."

PILOT D. B. SIMMONS
AOPA Member No. 27806

In Canada too private pilots and plane owners say there's only one organization that gives them *everything:* time saving—money saving—protection—convenience and all around the calendar service. That's AOPA!

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Listed below, right next to your membership application blank, are some of the many valuable AOPA service features. Any one of these is more than enough to make the $5.00 per year membership fee well worth the investment. But you get them all. You get the accumulation of years of effort in behalf of private aviation . . coast-to-coast service . . . representation by experts when help is needed most . . . and last but not least the knowledge that you "belong" . . . belong to the finest group of private flyers in the world.

Join today. Fill out the coupon below and mail it in with your $5.00 membership fee right away. The sooner you join the sooner you'll start cashing in on those time, money and worry saving features that have made AOPA the talk of private flying.

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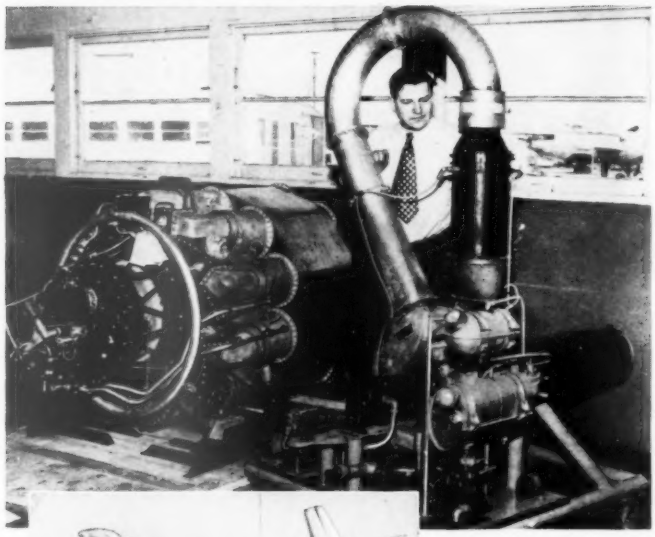

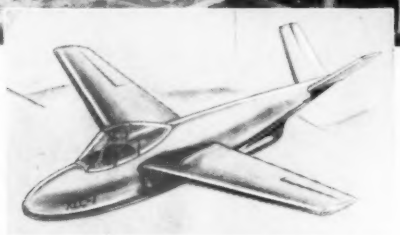

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F-3

These businesses reached new sales "highs"

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BLIZZARD LIFELINE

Tons of snow blocked roads and rails. Only planes could get through with vital emergency supplies.

Trains, buses, automobiles were snowed in. But U.S. lightplane pilots saved hundreds of lives in storm.

By BYRON M. JOHNSON

NEBRASKA cattlemen, huddled around radio sets in remote ranches, heard a routine winter weather announcement:

"Attention, Stockmen. This is a special warning for Nebraska. Cold wave west portion tonight and entire state Monday, with temperature falling to zero in the northwest tonight. Light snow. Increasing winds. Keep tuned to your Scottsbluff station KOLT for the latest weather."

The warning was flashed to all CAA communication stations from Kansas City at 10:22 a.m., January 2. Other warnings followed quickly, but neither weather experts nor ranchers had an intimation of the catastrophe to come. The light snow that fell Sunday afternoon in South Dakota, Wyoming, Colorado and Nebraska was but a prelude to the great "Blizzard of '49" which howled its arrival early on Monday morning, January 3, driven by a 40 to 50 m.p.h. wind.

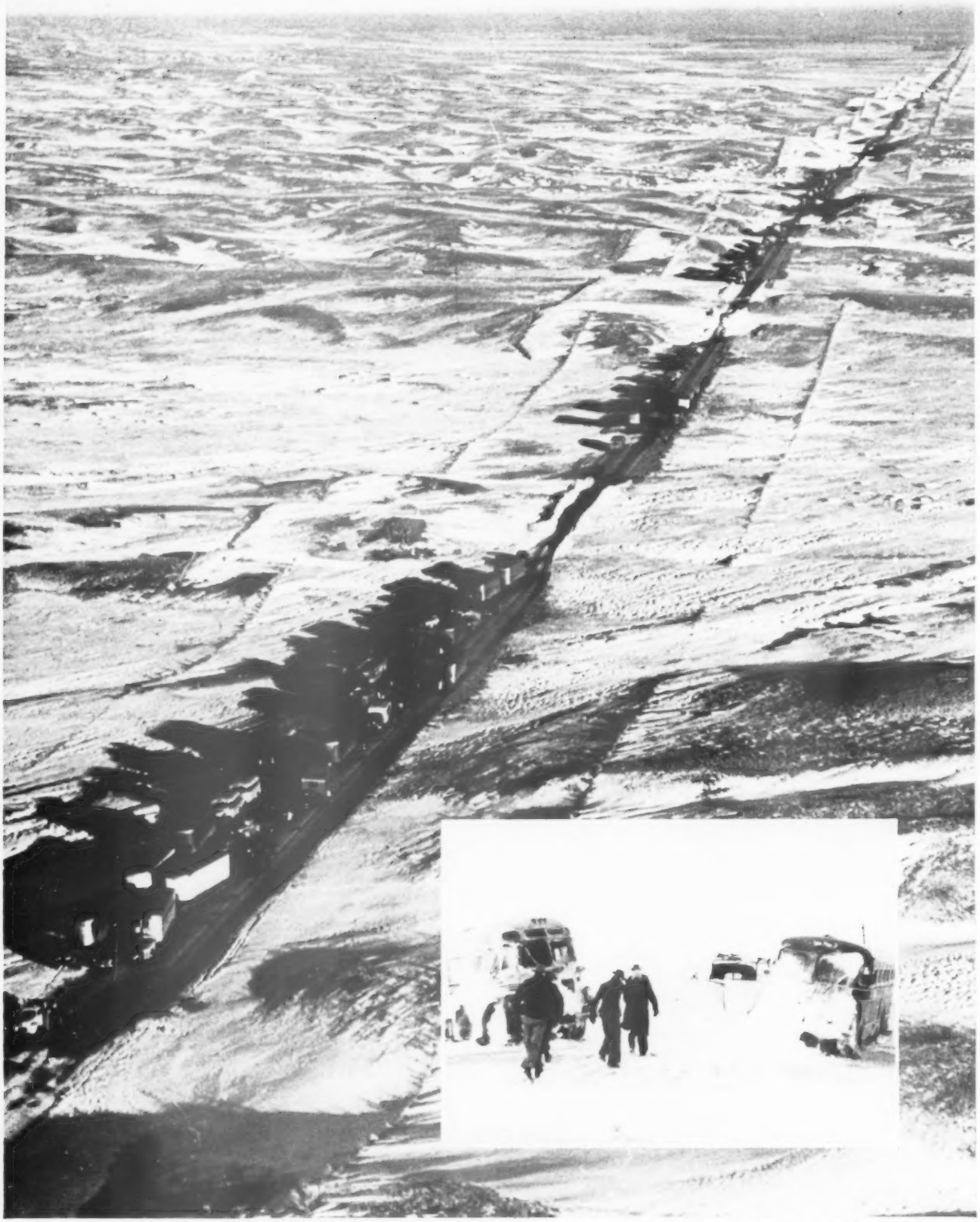
Highways from the Rockies to the western plains disappeared under swirling drifts. Stalled trains and buses were isolated. Name a town—any town—and you could find a snowbound train or bus. Dispatchers growled, "The hell with 'em" and threw their schedules out the window.

Rescue trains disappeared into the blinding blizzard—and within hours additional rescue units were dispatched to rescue the rescuers.

Slowly, all transportation in the blizzard area was lashed to a standstill by the window-rattling force of wind and snow. And, as the storm raged for 48 hours, 8,000 storm-groggy persons were stranded in southern Wyoming, northeastern Colorado and western Nebraska.

Emergency messages flashed by teletype, phone and radio to the State Highway patrol, Red Cross, police and doctors.

When the skies cleared Wednesday morning, the greatest series of air rescues in aviation history was planned and organized. Airport operators, the



Stranded on highway west of Brule, Neb., line of 200 cars and trucks clogs road for three days waiting for snowplows to push through mile-long drift. Inset, two buses, 35 autos are snowbound for 30 hours near Dodge City, Kan. These are typical of cases which lightplanes aided.

Rescue headquarters at Chadron, Neb., was on municipal airport. Crusted snow prevented use of runways, but highway department cleared adjacent roadway (foreground) for use as airstrip. Cessna is being readied for rescue flight. Ambulances met plane at airport.

Civil Air Patrol and volunteer pilot groups joined in perhaps the most dramatic chapter in the records of light, personal aircraft.

Air evacuation and aerial search for persons who had not been heard from since the beginning of the storm got top priority. At Chadron, Neb., the first move by the highway department was to send all available equipment west in an effort to reach and clear the municipal airport. It was impossible to push back the crusted 40-inch layer of snow on the airport, but a stretch of adjacent highway was cleared to serve as a runway.

One of the first rescues was made by Earl Dillard of the Hogan Flying Service, Mitchell, Neb. Dillard landed his ski-equipped Cessna 120 in a corn field in a 35- to 40-mile cross wind, alongside the stranded car of a Mr. and Mrs. Plummer of Scottsbluff who had been marooned since Sunday night. The three of them (Plummer wedged in the baggage compartment) made a daring take-off which Dillard later called "one of those things that seem almost impossible." The Plummers had been reduced to gnawing dry corn obtained from the field in which their rescue plane landed. "We figured it was just a matter of waiting until morning . . ." said Plummer—but the third morning had dawned before Dillard got them out.

Pat Clinch, Clinch Flying Service, North Platte, evacuated Mrs. Melvin Gibbs of Wallace, Neb., who had acute appendicitis. On the same trip, Elwin Murray of Wallace, an accident victim who was suffering loss of blood and needed transfusions, was flown out. Both recovered. The ambulance which met the Clinch's Cessna 170 carried Mrs. Melvin Dikeman of Hershey, who was loaded in the plane and flown to Omaha for medical treatment.

An 18-month-old boy with severe frostbite of the hands and arms requiring extensive skin grafting was flown from Rushville to Omaha in a flight arranged by the child welfare department of the Nebraska Department of the American Legion.

Behind the flight and the boy's frostbite was a storm saga. When the blizzard struck, the family's trailer house roof blew off. They set out for another farm a quarter of a mile away. The trip took two hours and when Mrs. Peck fainted from exhaustion, her husband battled the storm, carrying his son in one arm and his inert wife in the other. They struggled to the neighbor's house, barely keeping their names from the (*Continued on page* 80)

Rail snowplows fought through heavy drifts but were unable to clean tracks for several days. Ground traffic was halted.

Airborne milk supply kept Grant, Neb., citizens fed. A week after the blizzard ended, the town still remained isolated.

Popular Red airliner, the Ilyushin 12 is a 27-passenger, tricycle-geared transport with 217 m.p.h. cruising speed, 1,860-mile range. Used by Aeroflot, top Russian airline. the IL-12's span is 104 ft. ½ in., length 69 ft. 10 in., height 20 ft. 6 in. It has two 1,630-h.p. engines.

Stalin's Strategic Airlines

The Iron Curtain hides a vast semi-military airline network with mileage exceeding that of all scheduled U. S. air carriers.

By CHARLES M. COOK
Vice-President, Industry Services, Inc.

SOVIET RUSSIA'S civil aviation system has been developed integrally with her military aviation. The only method of travel throughout many parts of the Soviet Union is by air, and the airlines have grown up with and been fostered and controlled by no less a person than Stalin himself.

The Soviet airlines had their inception when service was instituted on the Moscow-Nizhni-Novgorod run in 1923. From this beginning, they were considered part and parcel of the government system, and especially of the military. The only deviation from this policy is that military control has become more stringent.

As did the U.S., the Soviets long recognized the strategic significance of a large air transportation system, but only minor emphasis was placed on airline development until 1939—the beginning of World War II. Although the airlines' growth in the years between 1923 and 1939 was great, it was scarcely comparable to that of the U.S. lines.

In 1923 the Soviet lines carried 230 passengers and two tons of mail. By 1935 they had increased this to 122,939 passengers, 7,000 tons of mail and 12,000 tons of freight. In 1939 the Soviet lines had a route mileage of 88,239 (some of which may have been duplicated), while U.S. flag lines totalled 43,455 miles. They also carried 307,000 passengers, 11,517 tons of mail and 49,654 tons of freight—hardly equal to the U.S. scheduled figure of 2,000,000 passengers for the same year.

Even at this early stage, two significant facts are worth noting. First, the Soviet airline route miles were double those of the U.S. lines as early as 1939. Second, the freight carried by air at that time exceeded ours by better than 25 times.

Naturally the size of the Soviet Union has had much to do with explaining the large number of route miles. Russia's land transportation by our standards is primitive—but it is this very primitiveness that aids and fosters its air transport.

Although the war gave impetus to the growth of her airlines, the USSR's desperate need for aircraft in military operations required her to use nearly all Lend-Lease transport aircraft and IL-2 production for other than civil uses. During World War II the Soviet civil airlines functioned in a capacity similar to that of our ATC and NATS. Since the war, however, these aircraft have provided an

excellent backbone of airline equipment. Over 700 twin engined transports were given to Russia on Lend-Lease from the United States. In addition, hundreds of IL-2 transports (similar to DC-3s) were built at the Voroshilov plant during the war.

Stalin personally, as well as the Communist party, is doing much to foster present-day Soviet civil and transport aviation. To interconnect the vast reaches of the USSR, aviation is the only source of communication and transportation readily available. Especially in Siberia there still remain many places to be colonized and exploited, some totally inaccessible by land or rail. Others can be reached only during winter when the frozen rivers serve as a traffic artery.

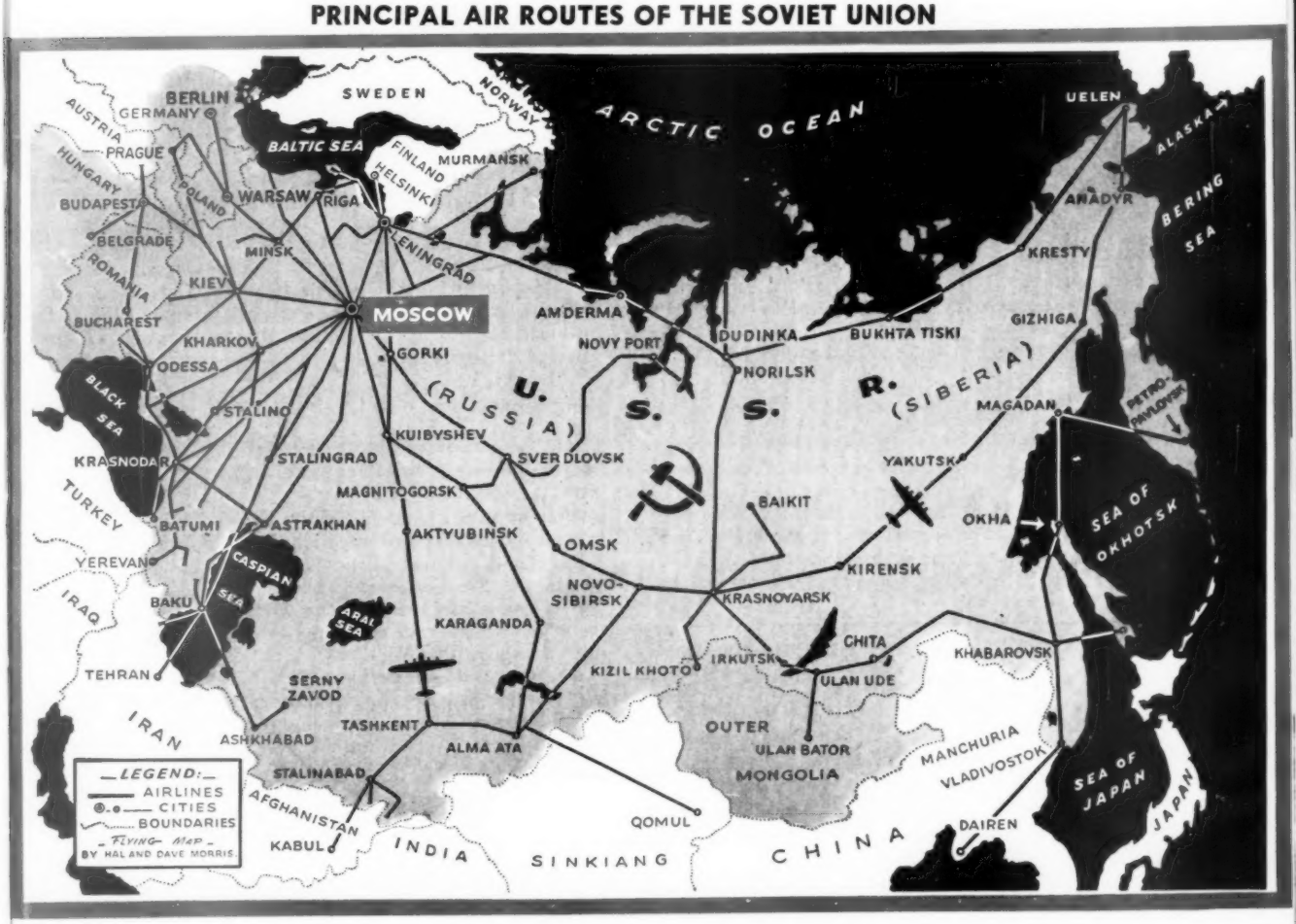
In the more populous sections of Russia, even west of the Urals, there are almost no good all-weather roads (there are only a few thousand miles of paved roads in the entire USSR), and trucks are used almost exclusively in the cities. Thus rail transportation is the only possible other means of travel and during the war Russia lost about 58 per cent of her rolling stock and better than 25 per cent of her railroad track mileage. Efforts are being made to restore these losses but rail lines and equipment are not quickly or easily built.

Today the Soviet civil airlines are one of the most rapidly progressing parts of Russia's national economy. Civil airports are being built and rebuilt, new and improved aircraft are being placed in service, navigation facilities and airways communications are being developed and expanded, and radio ranges are being installed. As 1948 drew to a close total Soviet route miles were expected to be 137,500 (U. S. flag totals 95,503 for 1947) already exceeding the 1950 goal by 25 per cent with over 2,000,000 passengers carried, exceeding the 1947 figure of 1,500,000 passengers by one-third. Russia estimates that by 1950 the airlines will carry over 4,000,000 passengers annually.

By comparison, U. S. Airlines are carrying many more passengers—nearly 2,000,000 in 1939 which is what the Soviets carried in 1948. Freight and express hauling is another matter: in 1939 the U. S. lines carried only 4,500 tons; in 1947, 115,000 tons as against Russia's 50,000 tons and 120,000 tons for the same respective years. The Soviet goal for 1950 is 240,000 tons. Thus it is clear that Russia is concentrating most of her airline activity on the carrying of freight and mail. Passengers are secondary. Siberia will be developed almost entirely through air transportation where feasible. Even in 1940 the airline system of over 88,000 miles exceeded the then existent railroad trackage. With the loss of her rolling stock, and her railroad mileage reduced to 60,000 as a result of the war, it is sure that the present day airline system of 137,000 miles is several times that of the effective railway lines.

The cost of passenger travel on the Soviet airlines is not cheap by our standards. Air passenger fares apparently vary with distance; for instance, the fare from Moscow to Vladivostok at current exchange rates averages about 6½ cents per mile, (*Continued on page* 72)

PRINCIPAL AIR ROUTES OF THE SOVIET UNION



PAPER AIR FORCE

U. S. Air Reserves are not ready for war. They are not as good as their press agents say they are.

By J. WILLIAM WELSH

THE TEN fighter pilots hustled from the squadron ready room and climbed into their Grumman *Hellcats*. Aside from short practice sessions at the Naval Air Station's pistol range, they hadn't fired a shot in their two years of inactive duty.

The pilots were eager. A pot was collected ("winner take all") and the boys were ready for aerial gunnery practice—for the first time in 24 months of peacetime Naval Air Reserve operations.

When the gunnery hop was over the pilots huddled around the sleeve, boasting of the hits they registered. They studied the long white strip of cloth. While the others watched, the Type Training Officer searched for holes in the cloth. He found one blue-smeared hole.

"Who had blue?" he asked. A voice from the rear piped up—"That's mine."

"Here's your money," said the TTO, and dejectedly handed over the pot.

On that flight made by wartime Naval aviators, now in the Reserve, 10 pilots had fired 1,000 rounds of ammunition. They got one hit. That's an average of 1/10th of 1 per cent.

Yet most of those flyers wore DFCs. They had shot down Jap planes in combat. Each had qualified with a 10 per cent average in gunnery in order to win his wings.

Their scores were poor for just one reason. They lacked practice.

They had not fired a single shot from those Reserve F6Fs in over two years of peacetime operations.

But that is not what their records showed. Just two months earlier, the squadron's gunnery officers *put the squadron on record* as having fired several thousand rounds of ammo from their planes in the preceding year. The record was falsified. It was prepared for the admiral who is chief of Naval Reserve Training. It made the squadron look good—on paper.

Unfortunately, paper Air Forces cannot win wars. No squadron can destroy an enemy nation's bombers and fighters with fraudulent gunnery reports.

This instance is not isolated. It is indicative of the status of the civilian air components of U. S. defense forces. Our reserve air forces, contrary to their publicity blurbs, are not up to snuff.

Our air reserves are *capable* of being a first-rate fighting outfit. But their activities are being hampered; and their paper records show them ready to perform missions of which they are not capable today!

What is the mission of the air reserve components?

In 1946 when the Naval Air Reserve (Organized and Volunteer elements), the Air Force Reserve and the Air National Guard were organized, they were expected to perform these jobs:

1. To constitute a 30-day fighting force which could move into combat with regular units at the outbreak of hostilities.

2. To provide a larger force which, with minimum training, could enter combat anywhere from 90 to 360 days after war begins.

The Organized elements of the Naval Air Reserve and the Air National Guard were scheduled to form the initial force. The Volunteer elements of the Naval Air Reserve and the Air Forces Reserve were to form the second force.

It is impossible to determine whether, with intensified training, the reserves could perform the second mission outlined above.

But they could not perform the first mission. Brig. Gen. W. W. Kratz, commanding general of the 71st Wing of the Air National Guard, recently admitted that the Air Guard "is not yet an M-Day outfit." He also said that not all of squadrons could go into "effective action if an emergency arose."

In some instances, the reserves don't even have the manpower. Until last July, the Naval Air Reserve (Organized) faced a personnel problem. Their ranks were nearly filled, however, by young men seeking to escape the peacetime draft. The Air National Guard (whose authorized strength is about (*Continued on page* 69)

☆

Lieut. Gen.

Elwood R. Quesada

Most informed observers believe that General Quesada, new head of the Air Force Reserve, will put his command on a fighting basis. His recent appointment, at the request of President Truman, may result in a more powerful auxiliary to the Air Force.

↑ **Largest planes** most Air Force reservists fly are AT-6s (above) and C-45s. AFR currently has only 10 A-26s, no late combat models. The Reserve is not ready for warfare.

Navy reservists follow a regular training routine, with five hours devoted to simulated carrier landings. No jets ↓ are used by Naval Reserve, however, and red tape abounds.

Republic Thunderjets, 600-m.p.h. fighters of the U.S. Air Force, are designed for maximum ranges exceeding 1,500 miles.

HOW TO FLY THE THUNDERJET

WHAT'S it like to fly a jet? That question is asked daily around Air Force bases or clubs where pilots congregate. To answer it, the editors of FLYING have huddled with five ace Republic Aviation Corporation test pilots to prepare this story of a typical flight in a Republic F-84 (*Thunderjet*), currently in service with the three major Air Force commands.

The test pilots (Carl Bellinger, Oscar Hass, Pete Collins, Jack Bade and John McGuyrt) combined to give the hints contained on the following pages.

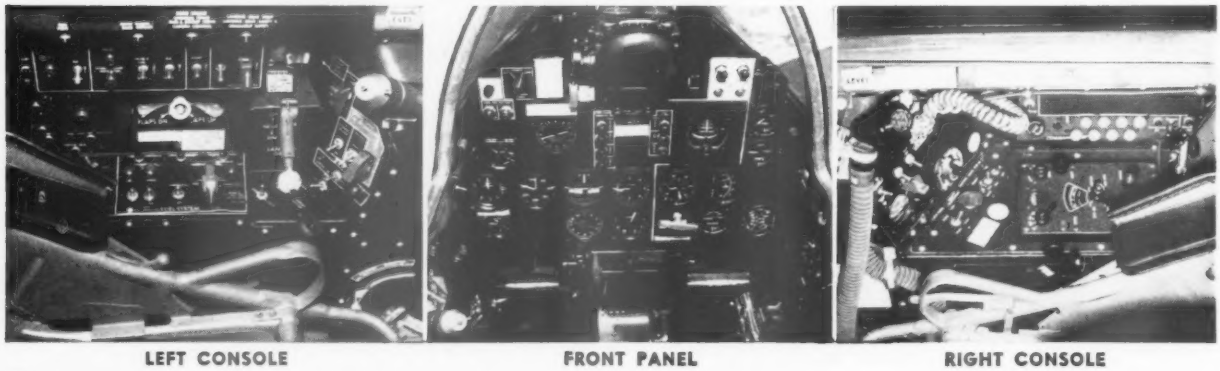
They report actions on a typical 1 hr. 4 min. flight from the Republic factory at Farmingdale, L. I. The flight covered 400 miles and five states—Connecticut, Massachusetts, New York, Pennsylvania and New Jersey.

The F-84 has a combat radius of over 600 miles, which means a range of over 1500 miles. Service ceiling is above 40,000 feet. It is powered by a GE-Allison J-35 axial flow type turbine developing 4,000 pounds thrust at 7,700 r.p.m. Wingspan is 46 ft. 5 in., length 37 ft. 3 in.

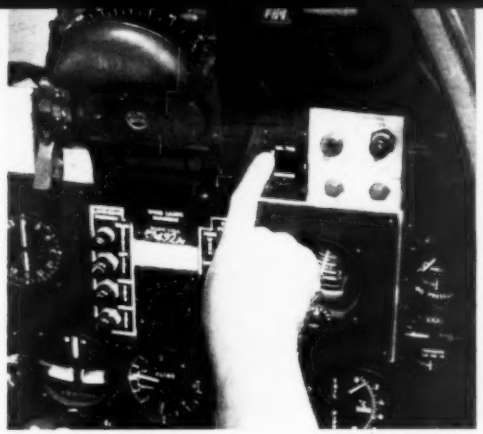
In addition to information contained in the photo story *(see next four pages)*, Republic's test pilots added some general data on flight characteristics of the sleek 600 m.p.h. fighter:

The eight-ton F-84 takes about 4,000 feet to become airborne on a normal (*Continued on page* 63)

INSTRUMENT PANELS OF THE REPUBLIC F-84



LEFT CONSOLE | FRONT PANEL | RIGHT CONSOLE

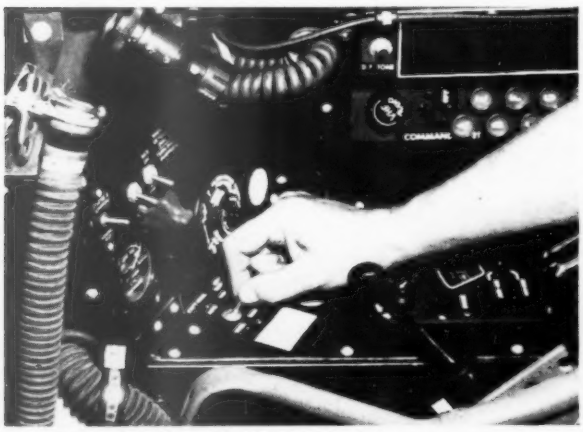


1 Pre-flight check is important. See that dust covers are removed from the air-intake scoop in the nose and from the tailpipe. Ask mechanic to remove pitot tube cover from the pitot head, located at the leading edge of the fin. Make sure ground lock-down plug on nose gear is removed, and see that the nose gear strut is extended correctly. Red marks on the strut indicate the correct setting. Get adjusted comfortably in seat, and look over controls and instruments.

2 After reviewing instruments prepare yourself for the flight. Connect oxygen hose and radio cables. Fasten seat belt and shoulder harness; uncage flight instruments and release control lock on control stick. Then check fuel quantity gauge on panel and set fuel counter to indicated fuel load (above).

3 Try brake pedals for firm, positive action and reset the parking brake. Check the landing gear control arm for "down-locked" and see that flap control is in "flaps-up" position. Test operate hydraulic hand pump (to left of seat), noting pressure increase on hydraulic gauge. A noticeable immediate reaction to the pump is adequate. Set elevator trim in neutral (above).

4 Check oxygen pressure gauge (should indicate 425 psi) and set altimeter (there are two—one for outside altitude indications and one on right console for cabin pressure altitude) at correct barometric pressure. Accelerometer should be 1G. Test all warning lights by applying a slight fingertip pressure on the bulb (above). The lights should ignite when working properly.

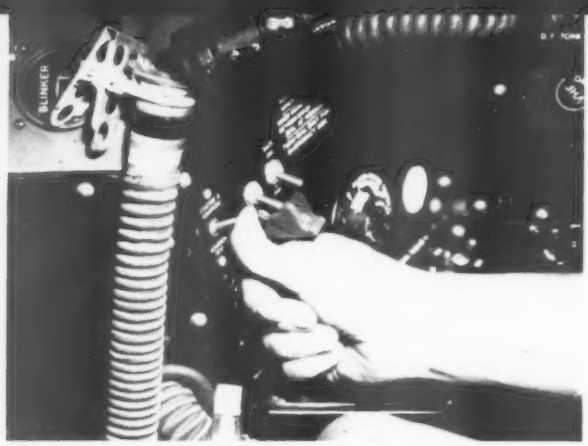


5 See that the pitot heater switch is in "off" position, and if the weather is warm set the cabin pressure switch to "ram" (above) until ready for take-off. Check flaps and trim. See that circuit breakers are in "on" position. Meanwhile the battery-generator truck moves into position. An outside power source is used to conserve the battery supply for emergency starts.

6 After the battery-generator truck has signaled "when ready," start the "fire" in this way: First set the throttle in "off" stop-cock position. See that the battery switch is in the "off" position and signal the ground crewmen to install the starter cable in receptacle under fuselage (above). These are the final few steps before you will actually start the engine.

CONTINUED ON NEXT PAGE

7 Set fuel selector switch to "all on" (above) and turn on tip tank air pressure switches. On F-84, fuel flow is controlled automatically and tip tanks are emptied first. Flow from the wing tanks, forward tank and main tank are governed so as to maintain proper fuel load distribution at all times. See that personnel are clear of the danger areas near the nose and tail.



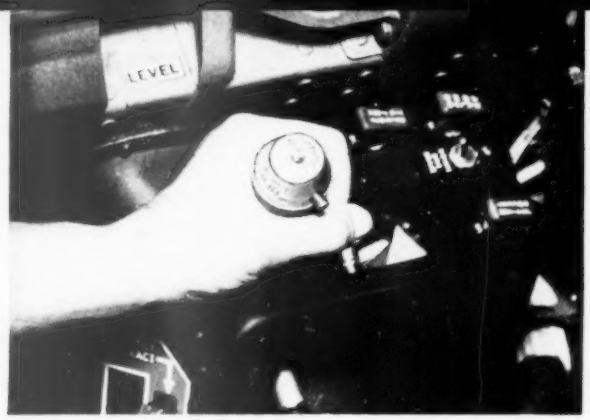
8 These steps are preliminary to starting the "fire," when your jet engine will actually be turning over. Safety precautions are especially important because of the tail blast and suction area around the air intake. Wait for the ground crewmen to signal "all clear," then push the starter-ignition switch to the "on" position (above). The starter turns up the engine slowly.

11 Check again to see that no one is near the nose and tail areas. Advance the throttle to 100 per cent (above) slowly until reaching 50 per cent. When at full power (about 7,700 r.p.m.) tailpipe temperature is normal so long as indicator does not exceed the red line on the instrument.

12 Be sure oil and fuel pressure fall within green line on instrument. Remember, you fly a jet by fuel pressure instead of manifold pressure, by tailpipe temperature instead of cylinder-head temperature, and by per cent of r.p.m. Hold throttle to full position. Check emergency fuel pump system by cutting-in emergency fuel pump switch. Turn fuel selector switch to emergency-landing and "take-off." Press emergency system test switch (above).

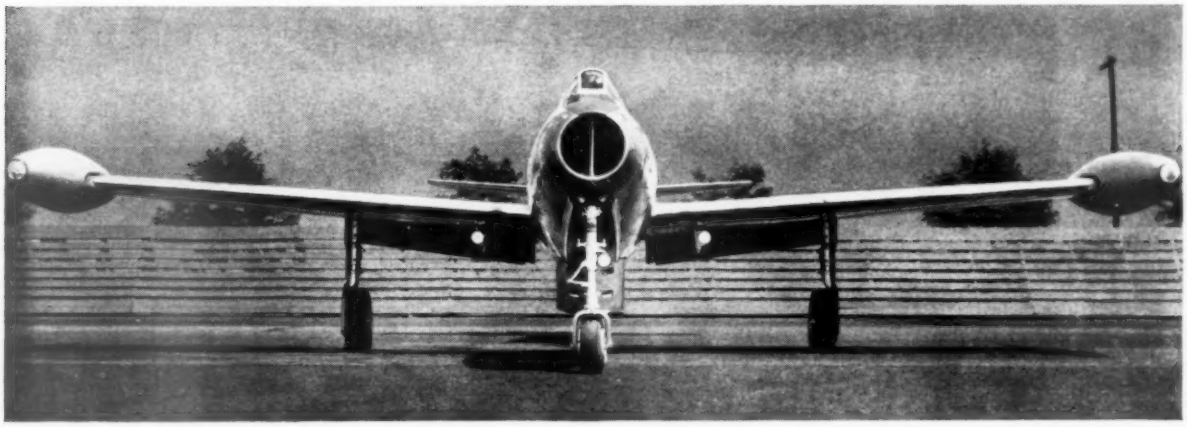
14 Cut-in the VHF radio and call tower (above) for taxi clearance to the take-off position. While waiting, run over some of the instruments again: tailpipe temperature normal; oil pressure 25 pounds; ammeter charging normal 25 per cent. See that elevator, rudder and aileron trim tab controls are in "neutral" position. Operate all of the controls for freedom of movement.

15 "All clear to taxi" comes from the tower. See that your taxi path is clear of personnel. Release parking brake, and apply power slowly through 50 per cent (about 70 per cent is required to start plane moving). Then taxi at 50 per cent. Avoid all quick turns because tailblast can injure personnel or damage equipment within 200 feet on each side of the runway (above).



9 When engine speed reaches 700 r.p.m. (about 10 per cent power) move throttle to full-open position, then retard immediately to automatic "stop-idle" position (above) which normally provides about 30 per cent power. Engine starts normally within five seconds; if not, close throttle to "stop-cock," cut ignition and starter, and try it again in two to three minutes.

10 As soon as the engine starts, watch the tailpipe temperature gauge, making sure the pointer does not exceed 820° (C.) while starting. Cut starter and ignition switch and signal crewmen for removal of starter cable at 40 per cent r.p.m. Adjust the throttle to maintain fuel pressure at 50 psi. Then turn generator and battery switch to "on" (above). You're on your own.



13 After you press the emergency test switch (which cuts off normal fuel system), the engine should operate within 2 or 3 per cent of 100 per cent power. Then return the emergency test switch to "off" position and retard throttle to "idle-stop." Now test the landing flaps, dive recovery flaps and dive brakes. Have ground crew verify that flaps are down and dive brake is down (above). Hydraulic pressure should read 1,700 psi. Next check the aileron boost system, an F-84 feature which helps relieve you of high-speed flight loads on the controls. You can set the ratio from 6 to 1, to 10.8 to 1. Select the setting that will give you the right "feel" of the stick. Retract the plane's dive recovery flaps and dive brakes, and return the landing flaps to an indicated 20° setting for the take-off.

16 At take-off position set brakes and call tower for clearance. Recheck cockpit: keep power setting at 50 per cent; check for 20 per cent flaps; see that trim tab control on stick is in "neutral" and that tip tank air pressure switches are on; move the fuel selector switch to "emergency-landing and take-off"; close canopy and try controls. After tower clearance release parking brake. (It is unnecessary to warm-up or check-run jet engines before take-off). Push throttle forward from 50 per cent to 100 per cent r.p.m. Hold brakes until engine reaches full power. When your airspeed needle approaches 125 m.p.h., pull the plane off gently in a slightly nose-high attitude. When airborne, retract landing gear. Airspeed increases rapidly as gear retracts. At 180 to 200 m.p.h. retract flaps.

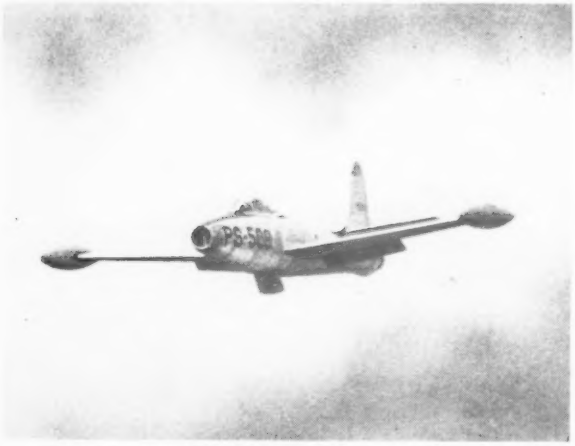
CONTINUED ON NEXT PAGE

17 Keep throttle at full power, continue to climb. Low altitude flying with jets eats up fuel. Most efficient climb speed is about 365 m.p.h. indicated. At 3,000 feet return fuel selector switch to "all on" position (above), cutting out emergency system. If you should later have a failure of the normal system, you can return to emergency system for an air re-start.

18 While climbing to 30,000 feet (above) check all instruments. Set radio compass and take sample bearings on nearby radio ranges and stations. At 10,000 feet, check cabin pressure system. Throttle back to 65 per cent r.p.m. before turning cabin temperature rheostat to "automatic." Oxygen flow is automatic. Check flow indicator to make certain that it is working.

19 As outside temperature drops, windshield may fog up. Switch on defroster switch. Level off at 30,000 and trim for level flight. Cabin altimeter should indicate pressure level of about 18,000 feet. Run a quick position check with radio compass. Note ease of control movement.

20 Practice gentle turns, climbs and dives. Avoid sharp control action as high-speed stalls or high "G" loads are quickly encountered. In high-speed dives, do not exceed 7-Gs on the pull-out. When ready to go down for landing, hold throttle at 92 per cent and keep approximately 350 m.p.h. indicated, or about 600 m.p.h. true speed. Level out at about 3,000 feet. Test landing gear warning horn, lights. Keep cabin pressure on. Cockpit is warm without cooler.



21 Coming in, retard throttle to 60 per cent r.p.m., extend dive brake. Let airspeed drop to about 200 m.p.h., turn fuel selector switch to "emergency-landing and take-off." Maintain 200 m.p.h. until entering base leg. Extend landing gear on downwind leg, with wheels down and locked. Turn into base leg at 1,000 feet, throttle back to 50 per cent, hold airspeed at 170.

22 On final, keep speed at 150. Hold 50 per cent power until ready to flare out, then cut throttle to "idle-stop." Touch down at about 122 m.p.h. Stop engine by retarding throttle beyond "idle-stop" position. Signal ground crew to chock wheels, turn fuel selector switch off. Cut generator, radio, cabin pressure system and battery. Mechanics will set brakes after they cool.

If you've never flown, here's a test that will tell you how good a pilot you can become.

Could You Fly a Plane?

By HAL J. BASHAM

IF YOU have never wondered whether you could fly an airplane, you've read far enough in this article already. But if you want to know right now what natural aptitude you possess for becoming a pilot by all means read on.

In recent years vocational counselors have learned to measure with remarkable accuracy the natural aptitude a person has for doing most any kind of job. The inherent ability of any individual to fly modern airplanes can be measured by special aptitude tests.

With the cooperation of Dr. Stuart R. Smith, eminent Boston psychiatrist, a pilot and former army flight surgeon, the following test for estimating innate capacity for flying has been devised.

This test is not concerned with your technical knowledge and education, but with your personal skills—the innate capabilities which you possess that indicate natural flying ability.

The more honest you are with yourself in answering the questions the more accurate will be the appraisal of your natural capacity for flying. Scattered through the test are questions which have no bearing on the problem at all, so don't worry about any (*Continued on page* 71)

MEASURE YOUR FLYING APTITUDE

If your answer is YES, put a "Y" in the blank provided.
If your answer is NO, place an "N" in the space.

1. Do you dance?
2. Have you had more than one driving accident involving other vehicles than the one you were driving?
3. Can you roller skate?
4. Did you make generally passing grades in school?
5. Can you ride a bicycle?
6. Do you have any tendency to "freeze up" when you get in a tight place while driving?
7. Do you have chronic or severe sea, train, or car sickness?
8. Can you operate an outboard motor or a washing machine?
9. When you start to cross a street in traffic do you usually take a step then stop, start again then decide not to go, etc., before finally going ahead?
10. Have you ever had a fainting spell in which your body became tense and rigid?
11. Can you ice skate?
12. When you go to pass a car do you have trouble judging how far away approaching automobiles are?
13. Have you ever made repairs on bicycles, sewing machines, vacuum cleaners, cars or any other mechanical contrivances?
14. Can you play tennis?
15. Did you ever build things with tools such as toys, furniture or nick nacks?
16. Have you ridden in the pilot's compartment of an airplane?
17. Do you swim?
18. When the driver of a car in which you are riding gets in a tight squeeze do you push on the floorboards "to help him"?
19. Do you have a very strong desire to fly a plane yourself?
20. Do you frequently forget to turn off electrical appliances?
21. Did you have a hard time learning to drive a car?
22. Did you ever build and fly model airplanes?
23. Does someone else's driving frequently frighten you and make you nervous?
24. Have you had any accidents involving only your car?
25. Do you understand in a general way the workings of your car or any other machinery?
26. Do you frequently forget to turn out the car lights when you park downtown at night?
27. Do you feel uneasy upon looking down from high places such as tall buildings, bridges or cliffs?
28. Do you have a general idea of how piloting is done?
29. When driving do you make several false starts, changing your mind several times before going ahead when you pass a car ahead of you?
30. Are you afraid, although you are told flying is safe, that misfortune will strike and you will crash the time you go up?
31. Do you have an understanding of aerodynamics; have you a general idea of what makes an airplane fly?
32. Do you usually slow down considerably when you meet approaching cars while driving at night?
33. Are you well acquainted with some one who currently holds a pilot's certificate and does considerable flying?
34. Did you ever build with an erector or tinker toy set?
35. Does driving at night make you nervous?
36. Do you take medicine or treatments regularly under doctor's directions?
37. Do you ride horseback?
38. Do you become excited when you encounter some everyday emergency?
39. Do you hunt and shoot?
40. Was dancing hard for you to learn?
41. Do you fish with either a casting rod or fly rod?
42. When you trip over something do you nearly always catch yourself without falling?
43. Would you like to be able to pilot a plane?
44. Do you frequently enter a store and find you have forgotten what you came for?
45. Do you enjoy getting in tight places which demand all your driving skill?
46. Do light airplanes look too frail and flimsy to you to be safe?
47. Do you play any musical instrument well?
48. Did you study geometry or trigonometry in school?
49. Do you think biplanes are safer than monoplanes?
50. Did you ever play basketball?
51. Have you ever studied physics?
52. Have you ever studied automobile mechanics, machine work or engineering of any kind?
53. Do you often forget and leave keys in the car?
54. Do you think most pilots are too reckless?
55. Without checking on it, is 31 the number of this page?

Answers on Page 71

First-time flyers Mrs. Milia Kapela (left) and Mrs. Edna Stevens had not left island home for 15 years before airlines came.

Island Hoppers

Hawaiian airlines link islands like a city streetcar network.

By B. CLAYTON, JR.

Editorial Director, Hawaiian Economic Foundation

EVERYBODY flies out in Hawaii—even the horses and cows.

A half million people on eight tiny dabs of land in the middle of the Pacific are so air-minded they make mainland airline executives green with envy. Hawaii's children are growing up to the knowledge that the plane is the *only* means of transportation. They climb aboard a DC-3 for a 200-mile overwater flight with the composed air of a New Jersey youngster stepping aboard a Greyhound bus for a fifty-mile trip down the pike.

The "air age" was thrust upon Hawaii. The islands are scattered kitty-corner across the 21st parallel for some 400 miles. A lot of water lies between each, and the only way to get from one to another is to swim or paddle an outrigger canoe or sail on an inter-island freight boat—or fly. Island airlines have made flying so easy that the latter is the obvious choice.

Weather is near perfect. Rain squalls are the only weather headache and only occasionally will torrential rains at Hilo, on the island of Hawaii, cancel a flight. The trips are so short that the "no smoking" signs in the cabins of the planes are never turned off. Shortest scheduled flight is the 25 miles between the islands of Molokai, home of the famous leper colony, and Lanai, where the Hawaiian Pineapple Company grows the major share of its Dole crop. Longest flight is between Honolulu and Hilo. A DC-3 will make the 216 miles in less than 90 minutes. There is practically no scheduled night flying. Pilots call it a "dream job" for they are back at home base every night.

With 10 DC-3 passenger planes and two freight planes flying out of its main terminal at John Rodgers Airfield in Honolulu, Hawaiian Airlines, Ltd., has done the most to make Hawaii one of the most air-minded communities in the world. The largest airline in the islands and the only CAB certified scheduled carrier, it also has done the most to make island flying safer than an automobile ride through congested downtown Honolulu.

It has flown 1,300,000 passengers 200,000,000 miles without a fatality. One wall of its executive offices is covered with special safety awards from the National Safety Council for its superb 19-year operating record.

Hawaiian Airlines started in 1929 as an offshoot of an inter-island steamship company (which it now dwarfs). It had two eight-passenger Sikorsky amphibians. One of its first passengers was 300-pound Hawaiian Princess Kawananakoa, for whom the airline graciously enlarged the hatch of one plane. In 1947 it flew 314,608 passengers and earned $186,469 on a gross of $3,353,910.

Every four minutes during its 18-hour operating day, a Hawaiian Airlines plane lands or takes-off from one of the seven commercial fields in the territory.

Hawaiian Airlines doesn't trust alone to good flying weather and short hauls.

A hard-working force of 500 (*Continued on page* 61)

Sixty-eight daily flights shown on Hawaiian Airlines' Honolulu board give commuter-like service to eight major islands.

HAWAIIAN AIRLINE TYCOON

Ruddy Tongg, 43-year-old Honolulu businessman, is typical of air-minded Hawaiians. Tongg is president of Trans-Pacific Airlines, Ltd., which flies five DC-3s on charter routes. He is also a publisher, real estate operator and financier.

Hawaiian Airlines plane flies over windward Oahu. Beyond break in mountains is Honolulu. With one of world's finest safety records, this line has flown 1,300,000 passengers 200,000,000 miles without a fatality. It has over 500 maintenance employees for 12 transports.

Fishing party boards plane in Honolulu, bound for Kauai. They use Trans-Pacific Airlines which specializes in transporting parties and sports teams.

Cargo of fish, caught off Hawaii's Kona coast, is flown to Honolulu. Air freight business is booming.

Germany's Ingenious Lightplanes

The Germans built a number of high performing planes that can teach American designers lessons today.

By
L. C. VOGEL

The author, shown here in cockpit of Messerschmitt Me-108, is one of the German scientists brought to work at Wright Field. He is now assigned to a private firm in New York City.

AFTER World War I, the Germans were forbidden to develop any type of military airplane. They did develop lightplanes, however, which were fantastically small and low-powered compared with anything that exists in the United States today. Their efforts to overcome the restrictions of the Allied powers resulted in ingenious developments, some of which are still useful today.

Since the Germans had only military plane-building experience, their first sport and tourist planes bore a military imprint. Many of the "new designs" were outright warplanes with minor modifications. Short-run airlines, aerial photography services and aviation schools sprang up. They all used these modified planes.

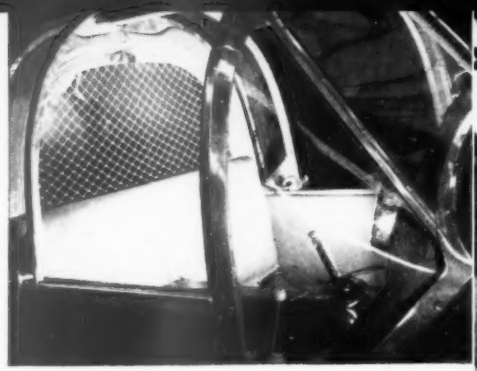
But the Allied Powers in the years 1920 to 1923 began to worry over this rebirth of German aviation and banned all sport or tourist planes with more than 60-h.p. engines. This changed the whole direction of German design. Interest in plane-building continued but it switched to low-powered craft with innumerable contests paying for design and construction costs.

The first engines to be built in any quantity for this new crop of light airplanes were the "Lilliputs," averaging six to eight h.p. When it became obvious that these did not offer sufficient reserve power or reliability, Daimler-Benz originated an aircooled Mercedes engine of 54 cu. in. cylinder displacement which developed 12.5 h.p., and the Mercedes-Daimler L-15, a midwing, two-place monoplane.

Later, Hans Klemm converted this type into a two-place low-wing monoplane, the Klemm L-20, using the same Mercedes engine. The L-20 included the use of the Junkers patented cantilever wing center section with modified fittings which enabled quick assembly and fold-back of the wings for road transport or storage. The L-20 weighed only 485 pounds, yet had a useful load of 375 pounds, (*Continued on page* 32)

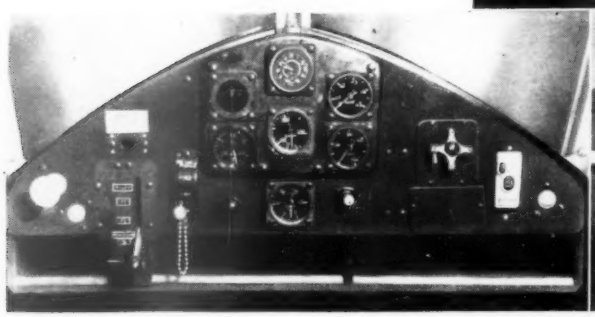
SIEBEL SI-202

The *Hummel* was a low-wing cantilever monoplane of plywood construction. It had two side-by-side seats with dual controls and cruised 84 m.p.h. on a 50-h.p. engine. Its range was short, though—only 292 miles—but this was considered adequate for German conditions. It was an attractive plane, even by present U. S. standards.



ARADO AR-79

An excellent pre-war German lightplane, the Ar-79 was a cantilever low-wing monoplane with a monocoque fuselage. Wings were tropic-proofed wood. Landing gear and split flaps retracted mechanically. Plane cruised 137 m.p.h. on 105-h.p. engine, had range over 650 miles. The two-place plane had a spacious baggage compartment (above) and was certificated for unrestricted acrobatics. Dive speed was 261 m.p.h.

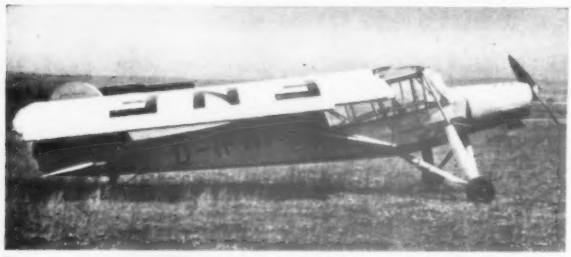


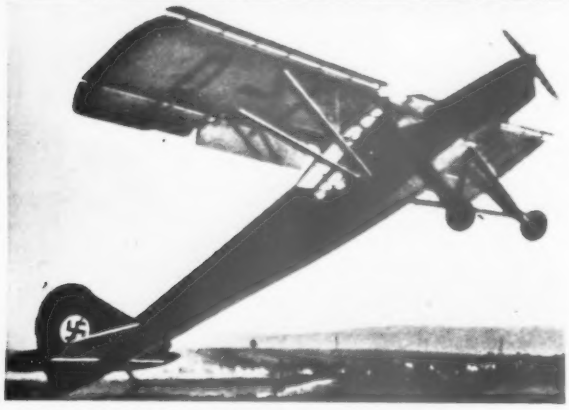
MESSERSCHMITT ME-108

A four-place all-metal executive-type plane, the *Taifun* cruised 165 m.p.h., yet could fly slower than 40 m.p.h. Its slots opened automatically at low speed. Production methods used on this personal plane were later adapted to all Messerschmitt warplanes.

Klemm L-25a was lightplane of the late 1920s. It weighed 629 pounds empty, had a useful load of 474 pounds. Top speed was 87 m.p.h. Dismantling for road transport took five minutes.

Gotha Go-150 was twin-engined lightplane with two 50-h.p. Zuendapp engines. Only a two-seater, it cruised at 122 m.p.h. and had a range of 500 miles. It could fly well on single engine.





Fieseler Fi-156 or "Stork" was a three-place liaison plane with amazing low-speed performance. Minimum level flight speed was 31 m.p.h., landing speed, 24.8 m.p.h. Wings folded.

a top speed of 62.1 m.p.h. and a cruise of 55.9 m.p.h. Its ceiling was 11,470 feet, range 186.2 miles, wing area 215.2 square feet, and its wing loading only four lbs. sq. ft.

Daimler-Benz increased the power of the engine to 20 h.p. but the need for still larger engines remained apparent. The fact is that the German engine industry never did produce a reliable 20-h.p. engine in the approximate 40-pound weight class, nor did it develop one in the 40-h.p. class. German designers were forced to rely on foreign engines, especially French and British models. The French Salmson AD-9 radial of 40 to 50 h.p. was in widespread use. With nine valve-in-head aluminum cylinders, it weighed about 150 pounds.

It was Klemm again who first used this Salmson engine in his L-25a (two-place) and L-25b (three place) aircraft. Both weighed 629 pounds empty, while the L-25a had a useful load of 474 pounds and the L-25b one of 803 pounds. Top speed of both was 87 m.p.h. Ceiling of the former was 21,360 feet, the latter 9,842.4 feet, with range varying between 280 and 935 miles. Fuel consumption was 2.6 to 3.1 gallons per hour, and the craft required only five minutes to dismantle for road transport. The L-25 won the Royal Trophy of Belgium in 1927, and the international lightplane competition in Orly, France, in 1928.

Prof. Hugo Junkers, father of the cantilever low wing, began development of an air-cooled 75-h.p. Diesel engine in 1928. There was to be a possibility of later doubling the horsepower. Piston ring difficulties encountered initially led to the introduction of the fire ring, which solved the piston problem of the aviation Diesel in general. Despite encouraging test performances, however, Professor Junkers did not complete the lightplane Diesel.

Junkers brought out the first all-metal lightplane, the A-50, in 1929. It was equipped with the 80/88-h.p. Armstrong Siddley *Genet* engine. This two-place low-wing monoplane had five hours fuel supply at 84 m.p.h. cruise. It weighed 650 pounds empty and had a useful load of 561 pounds. The four-spar Junkers wing was covered with corrugated sheet metal skin for torsional strength. Control surfaces were moved by push rods instead of control cables. The A-50 won numerous contests and made long-distance flights to the Orient and Africa. It was produced in some quantity.

The peculiar contest requirements which were established by the various contest committees, however, did not always result in what Americans would consider a satisfactory airplane. A Messerschmitt design, the BFW M-23, is an example. This plane won the International Rally of Europe for two successive years. It was a low-wing cantilever monoplane of plywood construction with single-sparred wings, foldable to the fuselage. Its performance was good. It climbed to 3,280 feet in five minutes, and had a top speed of 99.3 m.p.h. with its 80-h.p. Siemens SH-13 radial engine. Nevertheless, this plane could only be flown by experienced pilots because of the sudden breakaway of the airflow at slower speeds or larger angles of attack.

Tailless lightplanes, in which wings and control surfaces are one unit, were stimulated especially by prizes set aside by the Berlin journal *B.Z. Am Mittag*. Outstanding was the Delta IVd, an experimental lightplane designed by Alexander Lippisch.

The years between 1923 and 1933 were full of lightplane crusading in Germany. Designers and pilots were enthusiastic and courageous. Baron von Koenig-Warthausen flew around the world with the Klemm L-20 in the late twenties. He covered 18,620 miles on his flight in the 20-h.p. plane. Wolf Hirth, in 1930, started on a flight to the United States which was stopped in Iceland because of red tape. Hirth, with a Klemm L-25a and a 40-h.p. Salmson engine, flew with one (*Continued on page* 65)

"Do your knees knock? Do your hands sweat? Relax, old boy, there's nothing to it."

An Inspector LOOKS AT FLIGHT TESTS

By BEN ROBIN

Designated CAA Private and Commercial Flight Examiner

DO YOU suffer inspectoritis every time you go through a flight test? Most pilots do. It might help a little to ease your fears if you know just what to expect.

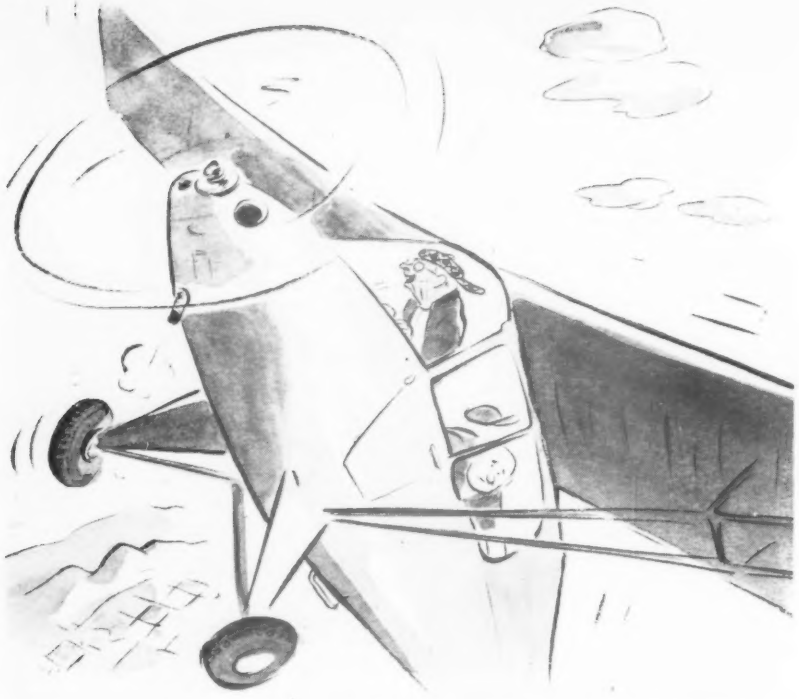
Until recently, every CAA examiner had his own pet theory on each maneuver required for a private or commercial license. Now, most senior inspectors hold regular meetings in order to standardize requirements.

I attended such a meeting at Central Airport, Camden, N. J., recently with Lynn S. Probst, CAA inspector for the area, presiding. I was one of 50 private and commercial flight examiners present, and left the meeting with a happy thought. No longer would I have to explain to flight test applicants why six different methods of executing S-turns across a road were all correct.

Let's discuss together some of the maneuvers required on a commercial flight test. The private license candidate will not have to perform all of these maneuvers, and will not be expected to display the same amount of skill as the commercial applicant, but generally the two tests are similar.

Make certain all your papers are in order because the CAA examiner who rides with you will not even get into the ship until these are all okay. You need a log book, your old license, a medical certificate and an application for the new license, with a licensed instructor's approval. You will have to provide a parachute, too, and make sure that it has been packed recently. Normally, your instructor will see to all these things, but don't depend on him alone. He is busy and has many students to worry about, while you have only yourself. Last, but also important, keep a $10 bill handy. That is the legal amount the flight examiner is entitled to charge for riding with a commercial license applicant. A private license ride takes about 60 minutes instead of 90 to 120 minutes for the commercial flight test and costs only $5.

Have the test ride ship in good condition, clean, both



"Granpappy Whipstall had been a flight instructor back in the days when I couldn't even walk. His performance was good but he forgot to execute his clearing turns."

inside and out—and don't forget the windshield. For your own safety it is up to you to see that the company with which you fly keeps its equipment clean and in airworthy condition. You will get off to a good start if you use chocks, brakes, and call starting signals well. If your instructor has practiced correct procedures with you throughout your training, they will come automatically.

I remember an ex-Army pilot who came to me for a commercial flight test last April. He had very little time in light aircraft and we never proceeded past the taxiing stage. The wind was blowing about 20 m.p.h. and our ship was a 65-h.p. *Cub*. The ground was soft from the early spring thaw and recent rains, and we taxied out downwind. In spite of all he had learned, the applicant kept stick full back, allowing the wind to sweep under the elevators and lift the tail when we hit a soft spot. I managed to keep the prop from hitting the ground and spent the next 30 minutes showing my student how to use elevators and ailerons in taxiing downwind, upwind, and crosswind. No one had ever shown him how to use stick into the wind, crosswind, or forward stick downwind. He moved that *Cub* on the ground at a speed that would be unsafe for a tricycle geared multi-engined job, and he wanted me to give him a license to carry passengers for hire. I sent him back for more dual and passed him the following month.

I usually have the applicant proceed with the high work first then continue lower until spot landings back at the field complete the test. A two-turn spin in each direction is required. Don't forget those clearing turns, 90° in each direction before starting any aerobatic maneuvers. When the throttle comes back, the carburetor heat must go on. You will be expected to use the NACA spin recovery. This means simply opposite rudder, stick forward, and neutralize controls in that order. Once you get used to it, spins on the mark will seem easier than with the old recovery method of kick and push-hell-out-of-everything. Or, perhaps you just used the go blah method of recovery—let go of everything and relax.

On my own six-month check ride recently, Senior Inspector Probst showed me a useful stunt in executing lazy eights. He picked a spot crosswind and proceeded to split that mark with both nose and wing tip. My head swung like the pendulum on grandpappy's clock, following that spot, but Mr. Probst never missed. The surprise came when I looked back to the *Cub's* rear seat and saw him looking only at the nose and the terrain directly below. I learned that afternoon, if you keep the aircraft over a road, section line or other reference point, while doing lazy eights, the ship will automatically split the distant reference mark. This allows more time for concentration on nose distance above and below the horizon (they should be equal). Try it next time you're up and as the parlor trick salesman says, "Simply amaze your companions!"

Chandelles must be demonstrated with and without throttle co-ordination. Just set the initial bank steeper on the one with set throttle and you'll come out okay. Never begin the recovery roll until 90° of the 180° maneuver is completed.

One of my commercial test flights this year brought up a gent we'll call Gran'pappy Whipstall. I remember him best by this monicker because he creaked at the knees and set the Aeronca *Champion* we used for this hop right up on its empennage. Gran'pappy had been a flight instructor back in the days when I couldn't even walk and he still wobbled a mean stick. It was just that things had changed since then. I apologized for my junior birdman's age (though I've reached the getting bald and pudgy stage), and asked Ol' Whipstall to let me try one.

As I did, I explained that the requirement now is simply to set up an angle with just enough back pressure to hold the initial angle of climb. The stick need not be all the way back when the airplane actually stalls. When the nose just drops, pop the stick gently but definitely forward, then use throttle and stick to bring the nose back up to the horizon. Gran'pappy Whipstall obliged, then, and came through with a perfect performance. He forgot to execute those clearing turns first, though. "Just another one of them gosh-blamed new fangled ideas," he complained.

Being able to pop the stick forward at the instant the ship stalls saves having to fight the rudder through an entire oscillation in order to keep the nose straight ahead. Never use ailerons to bring a wing up. They are practically useless in a stall anyhow. Start spin entry too with the nose just moderately above the horizon. The aircraft has less fall-through motion entering the first turn and will be less likely to spiral as so many lightplanes do.

Slow flight is simply approaching a stalled altitude with reduced power setting (about 1,600 r.p.m.'s in light ships) and loafing about in straight flight and turns in either direction. You may be asked to stall out of a turn during slow flight and recover straight ahead. This simply means hold a constant bank and in- (*Continued on page* 65)

A Lesson in Relativity

By HY SHERIDAN
Captain, American Airlines

UNITED STATES ATLANTIC FLEET
AIR FORCE ATTACK SQUADRON
SEVENTEEN ABLE

U.S. Naval Air Station
Quonset Point, R.I.

Dear Editor:

We have a problem, and by sending it to you, we hope to receive an answer that will back up either one side or the other in its argument.

Here it is:

A plane is approaching an airstrip preparatory to landing. It is FIFTY feet high, and traveling at an indicated airspeed of EIGHTY knots. The plane stalls at an indicated airspeed of SEVENTY knots. There is a FORTY knot headwind.

Suddenly the FORTY knots of wind stops completely and definitely.

WHAT WILL HAPPEN TO THE PLANE?

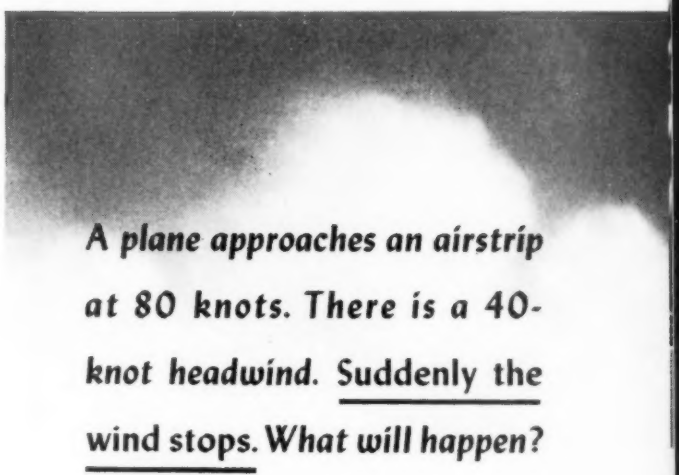
1. Will it stall?

2. Or will it continue its approach in a normal manner?

3. Will it lose FORTY knots airspeed at the moment the wind stops?

4. Will the airspeed indicator in the aircraft indicate FORTY knots lower at the instant the wind stops?

Sincerely,
G. R. Ranney, Ens., USNR



A plane approaches an airstrip at 80 knots. There is a 40-knot headwind. Suddenly the wind stops. What will happen?

DEAR Ensign Ranney:

"The airplane," the accident investigation board says, "was flying too low when it hit the ground."

The board is in a pretty safe position in taking that stand, it being clear enough, even to experts, that the airplane was not too high. This sort of thing does a lot to save argument but its contribution toward saving pilots and passengers is not too impressive.

Practical men wonder why the airplane was too low.

Most old-time pilots can recall, usually in the dead of the night, any number of reasons, some rare, some frequent. Is there any particular cause, one outstanding cause in point of frequency, for a pilot's being too low, especially for cracking up because he is too low?

Yes, there is, and, in spite of its frequency, it is the least understood of them all. Hence this story.

During the somewhat late war the Air Transport Command used a very sturdy plane, the justly famous DC-4, in considerable quantity and a careful tabulation was made of the various kinds of accidents it met up with. When your reporter checked out on the DC-4, his instructor showed him the latest figures up to that time. Seventy-eight per cent of the crashes were of one type: the airplane hit the ground just short of the runway it was about to land on.

Surely this is a most significant, even startling, determination, especially since most of these accidents occurred in good flying weather. Is there something mysterious that can happen to an (*Continued on page* 55)

Will the plane stall?
Will it lose 40 knots?
Will it continue normally?

Fabulous 'Pancho' Barnes

Landing at Pancho's, a Cessna 140 flies over cabins at the Rancho Oro Verde, halfway between Rosamond and Muroc.

Sunday morning finds Pancho (dark shirt, behind piano) leading pilot-guests in a few old flying songs.

Photographs and Story By DON DOWNIE

FLYING CAME easy for the granddaughter of the first Air Force pilot.

But then, so did almost everything else. Pancho Barnes, one of the best-loved and wackiest of flyers, has done almost everything.

At the age of four she danced on the stage with Pavlova.

In high school, she took up art and sold her paintings for $50 apiece.

She doubled in horseback scenes for Louise Fazenda in early motion pictures.

She even ran for election to the Los Angeles Board of Supervisors and finished third in a field of 12 applicants. She advertised for this job by sky-writing her name over the metropolis each afternoon—and 6,000 Angelenos voted for her.

Ever since she was old enough to walk, Florence Lowe Barnes knew that someday she would fly. Her grandfather, Thaddeus Sobieski Coulincourt (T.S.C.) Lowe, said that when she grew up, everyone would fly. He was the Union Army's Chief Aeronaut during the Civil War.

So no one in Southern California was much surprised when young Florence bought an OX-5 *Travelair* and set out to learn to fly. On her first three hops, instructor Ben Catlin thoroughly "wrang her out" because he didn't want any more girl students. After starting 23 girls, none of whom had soloed, he tried his best to discourage the granddaughter of the balloonist. She soloed six hours later. She was so elated that as soon as she landed, she went up again, taking her first passenger—Nelson Griffith, now a Lockheed engineer. He felt like celebrating too, so he wing-walked while Pancho, on her own for the second time, buzzed the field so everyone could see.

In this era just after Lindbergh's Atlantic hop, airport

Horses and planes mix at Pancho's. She owns 35 riding horses, rents them to flyers who visit the desert ranch.

Air racer, movie double, resort owner, legendary Pancho has done everything.

Long-time pilot Pancho Barnes is the granddaughter of the Union Army's chief aeronaut. She has participated in most of the era's big aviation events, but found time for jaunts such as an excursion to Mexico, masquerading as a man.

visitors came out to be amused. Young Florence and her *Travelair* helped the entertainment committee by flying parachute jumpers. She flew a jumper named Slim Zanmuller, a big guy with an exhibition 'chute, and passed the hat between jumps. Sometimes Slim fast-talked spectators, especially beautiful young ladies, into making their first parachute jumps. Many times, Florence Lowe Barnes skidded her *Travelair* around sideways while the jumper encouraged neophites with a strong shove.

During the heyday of prohibition she flew to Ensenada, Mexico, to do weekend exhibitions and hop passengers at $10 a head among the wealthy rum runners who had no place to spend their tax-free profits.

On the day she received her official private license, she led a flight of 65 planes to dedicate the Grand Central Airport in Glendale. Her passenger was Buron Fitts, then District Attorney of Los Angeles County. Just before take-off, a phone call asked, in typical Bogart style, "How much would you take to dump Fitts out?"

With the sudden rise of box office receipts from air movies, Pancho became technical director for "The Flying Fool," a Pathe film that was made at the same time Howard Hughes was shooting "Hell's Angels." She convinced her studio that it would be more profitable to pay her three pilots $100 per day for guaranteed work rather than $10 per head and re-shoot most of the scenes. Her pilots, Frank Clarke, Roy Wilson and Leo Nomis, have all made that final crash but they formed the beginning of the first pilot's labor union, the Motion Picture Pilot's Association, almost a year before the Airline Pilot's Association was founded. Pancho is a past president and the only woman member of the group.

Much of the legend of Pancho Barnes dates to the first "Powder Puff" derbies of that high-flying era. During the 1929 transcontinental race she was flying her speed-wing *Travelair*. The engine cowling was big and the visibility on landings was lousy. At Pecos, Texas, she turned on her final approach (*Continued on page* 58)

A FLYING Holiday

Fishing in Oregon

By BERNHARDT M. JENSEN

SNOW'S still a-flying in the Oregon Cascades, storing up water to keep its famous trout streams rushing. But it's not too early to plan a trip to break in that new reel you got for Christmas.

The State of Oregon has more championship-calibre fishing than any one state has a right to have. There is saltwater fishing, of course, and fishing for salmon and steelhead (a sea-going rainbow trout) on the streams that feed the ocean. The upper reaches of the Rogue River, the most famous of all steelhead streams, are easily reached from excellent airports in the Medford-Grants Pass area. But for a combination of scenery, climate, and natural wonders plus some of the world's finest lake and stream fishing, I'll take Central Oregon.

The Band-Cascade region (Portland sectional—W-1) is roughly the center 100-mile section of the backbone range of Oregon—the Cascades. Within this area are a couple of million acres of virgin forest land, more than 200 lakes, 1000 miles of the finest whitewater streams, lava fields, cinder cones and ice caves.

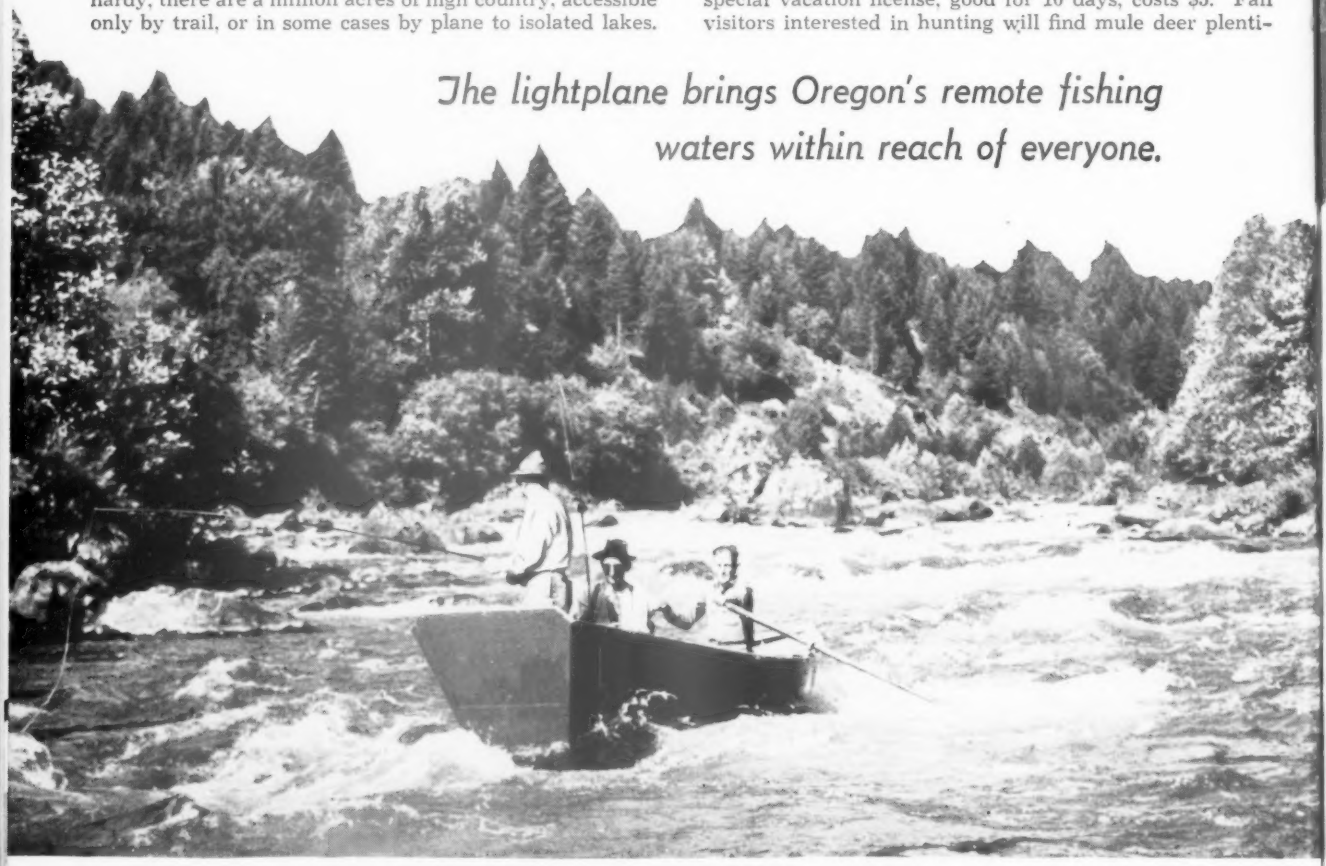
Nearly all the larger lakes have resorts and some have colonies of summer cabins. For the adventurous and hardy, there are a million acres of high country, accessible only by trail, or in some cases by plane to isolated lakes.

Centuries past, the whole Cascade Range was a chain of smoking, lava-belching volcanoes. The vast plains of the plateau which stretches to the east are the old lava flows, hundreds of feet deep. As volcanic activity subsided, forests covered the slopes and western edge of the plain. Streams carrying the melting snow sluiced deep gorges on their way north to the Columbia. The principal drainage system centers in the Deschutes River (corrupted from the *Riviere des Chutes* of the early French *voyageurs*) and its two main tributaries, the Metolius and Crooked Rivers. These are the famous fly-fishing streams, heavily stocked with fighting cutthroats, rainbow, Dolly Vardens, and eastern brook.

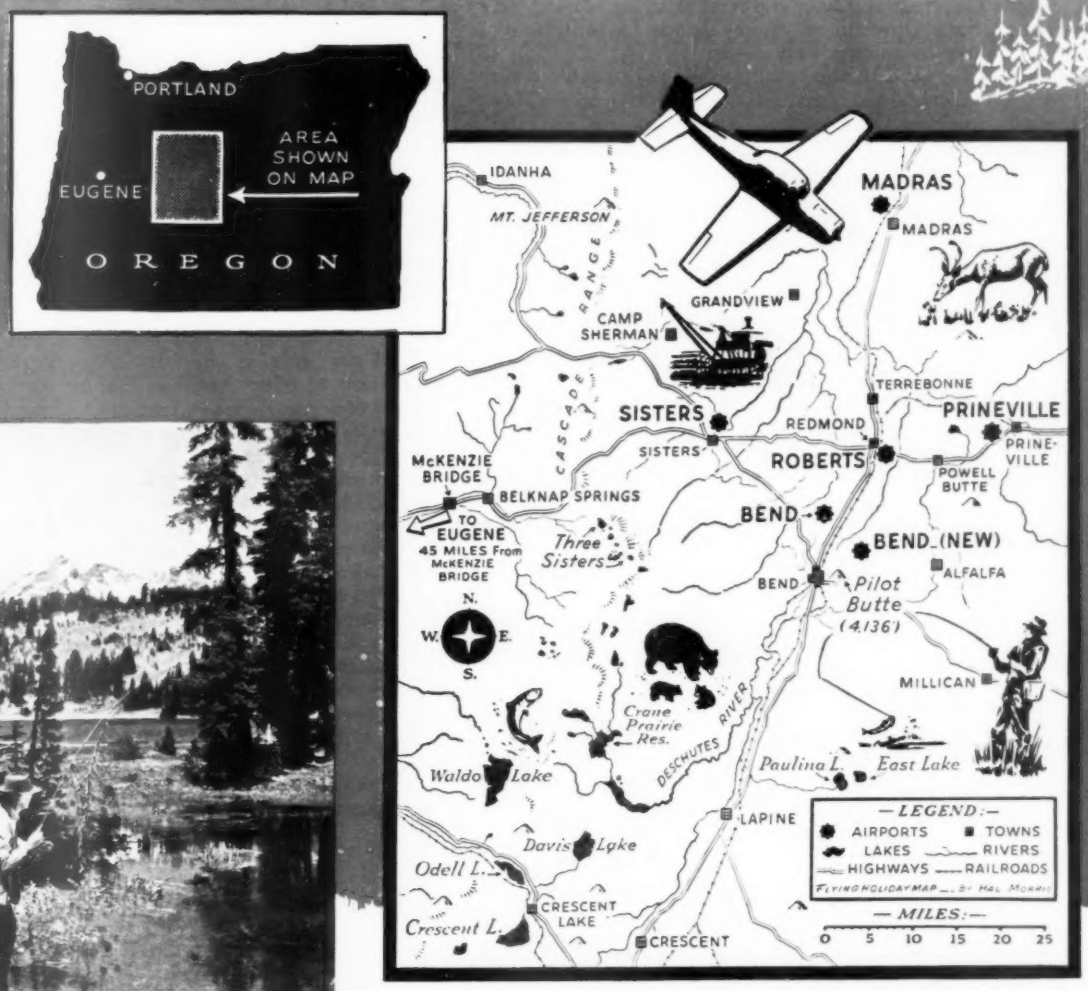
Those who prefer lake to stream fishing are well provided with testing grounds. Dozens of well-stocked lakes are accessible by road, and literally a hundred or more lightly-fished lakes by trail. While deep running spinners are used to raise some of the largest lake fish (Diamond Lake has recorded a 26-pound rainbow), the fly fisherman will find himself amply rewarded.

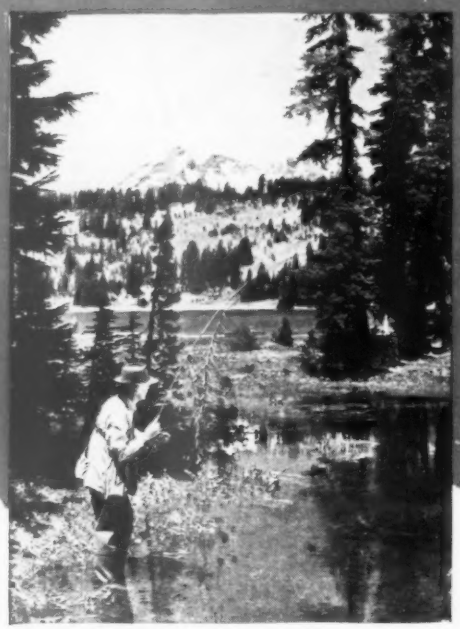
The season varies somewhat by districts, but is open generally from May through October. A non-resident special vacation license, good for 10 days, costs $5. Fall visitors interested in hunting will find mule deer plenti-

The lightplane brings Oregon's remote fishing waters within reach of everyone.



Oregon trout streams are near airports. Bend-Cascade region has good airfields, more than 200 lakes and 1,000 miles of whitewater streams.





Fly fishermen can take mountain trails to hundreds of well-stocked, lightly-fished lakes in Cascades.

ful, as well as black-tail and white-tail deer, antelope, elk and bear. Bird hunters have their choice of pheasant, quail, ducks and geese. And in season there are winter sports at famed Hoodoo Bowl or with the Bend Skyliners at Tumalo.

Don't expect limit catches from the edge of the landing strip. The largest and best catches naturally come from the less heavily fished areas. But top-flight fishing is available within an hour from downtown Bend or Redmond, for example, which makes it practical to use the excellent motels or hotel and be driven back and forth each day.

A number of the larger lakes are open enough for amphibious craft of good performance, but pilots lacking experience with mountain lake hazards should be wary. Remember, these lakes are from 4,000 to 6,000 feet in elevation. At present none of the lake resorts are offering any services for visiting planes, and the pilot will be strictly on his own if he attempts to land. If you plan to use the lakes, write the Forest Service, since lakes in the specially-reserved wilderness (*Continued on page 73*)

Roberts Field, one mile from Redmond, is CAA headquarters for eastern Oregon. The ex-Army airfield has two 7,000-foot runways.

★ Defense Cards on the Table

THE U. S. has a blueprint for its military aviation policy. Congress will have the final word in okaying the plan, but a Government committee has spoken bluntly in outlining the country's air needs.

For 25 days and 10 nights in late 1948 the nation's brass paraded before 14 members of the "Committee on the National Security Organization" (a "task-force" of the Hoover Commission on Government reorganization). Headed by Ferdinand Eberstadt, former chairman of Army and Navy Munitions Board and vice-chairman of WPB, the committee interviewed 245 of the top U. S. military brains. Committee staff members talked to hundreds of other political and military leaders.

Then—in a 211-page report—the Eberstadt Committee laid the country's defense cards on the table.

The bulky, mimeographed book contained few startling facts. It caused no flurry in world capitals. But the icy criticism of the report made some high-ranking officials re-evaluate their positions. Congress is certain to pore over it during the current session.

In the tense, critical months ahead, the Eberstadt recommendations may be decisive in determining the future of U. S. military aviation.

If the committee's recommendations are accepted, the Air Force and Naval Air Arm will continue to be separated. Both long-range bombers and carrier-based bombing tactics will be developed, at least for the time being.

Said the committee:

"It may be that land-based planes will some day so increase range and power as to eliminate any need for ship-based planes. [Perhaps] the development of long-range guided missiles will render all kinds of piloted strategic bombers obsolete. These conditions do not now exist."

Despite critics who decry current problems and slow development, the comn ittee found that progress of unification of the military services (under the National Security Act of 1947) is encouraging. Though not yet working perfectly, the unification act is soundly constructed, the committee decided. "Evolutionary processes, rather than revolutionary ones, [seem] . . . the proper approach."

Cost of the military establishment increased from $8 per capita in 1938 to $100 per capita in 1948. And the largest single element of the cost is air power. Of the $15 billion budgeted for the military services in the current fiscal year, roughly $8 billion will be used for Air Force and Naval aviation.

★ Build Navy and Army Airpower

Even so, the committee frowned on suggestions to merge the Navy Air Arm and the Air Force. "Until the form and character of another war can be predicted with more exactness than is now possible, it will be unsafe to 'put all our eggs in one basket.'" At present, "some duplication of effort between the Air Force and Naval Air Power seems reasonable whether or not the Air Force and the Naval Air Arm are merged. . . .

"The problem," the report went on, "is most strongly highlighted in relation to strategic air power. Primary responsibility in this field is now properly vested in the Air Force. Yet the present range of bombing planes is not sufficient to dispense with overseas air bases, which the Army will have to hold and the Navy service. Furthermore, defenses against mass strategic bombing (of the conventional pattern) have improved so greatly that the only practical method of attack in the future may be with atom bombs carried by single high-speed planes. These may be launched either from land bases or from carriers which, though highly vulnerable, are at the same time highly mobile. . . it would seem prudent to develop both land-based and carrier-based bombing. A merger of the two services could not remove this necessity, but might destroy the efficiency of one or both. . . .

THAT EBERSTADT REPORT

MAJOR RECOMMENDATIONS ON AIRPOWER

1. **Keep a separate Air Force and Naval Air Arm.**
   ". . . . it will be unsafe to 'put all our eggs in one basket'."
2. **Give more power to the Secretary of Defense.**
   ". . . sharpen his authority over the military budget."
3. **Eliminate wasteful military expenditures.**
   Don't settle Army-Navy problems "at expense of American taxpayer."
4. **Stop the bickering between the Army and Navy.**
   ". . . service rivalries must be kept within reasonable bounds."
5. **Keep land-based and carrier-based aircraft.**
   The atom bomb "may be launched either from land bases or carriers."
6. **Prepare for new and unconventional warfare.**
   ". . . . not only atom bomb, but radiological, biological and chemical weapons."

"Difficult problems will inevitably continue to exist between the Air Force and the Naval Air Arm. At present these are being settled too largely at the expense of the American taxpayer. This cannot go on. . . . The efforts of the Secretary of Defense at the Key West and Newport conferences to clarify the situation and to confine the limits of controversy through assignment of nonconflicting roles and missions are an important beginning. They deserve the sincere support of both branches of the service but they have not yet been fully accepted and implemented.

"It is the committee's judgment that more precise specifications of roles and missions, firmer determination to hunt out and extirpate all unnecessary duplication, insistence on the unification of the weapons that are provided to both services, and more joint education and training will tend steadily toward improvement in both the efficiency and economy of our military air establishments. No step that might imperil the combat efficiency of these two forces should be taken."

★ Patterson Dissents Vigorously

These recommendations were vigorously dissented from by Committee Member Robert P. Patterson, former Secretary of War, who strongly urged a single Department of Defense under a secretary with broad power to manage and direct the activities of the department. Patterson was particularly critical of departmental attitudes "of separation and self-aggrandizement that is hostile to teamwork, to efficiency and to economy. The frictions between the Navy and the Air Force are as sharp as before, and they bring about duplications and instances of 'empire building' that contribute virtually nothing to our military strength and are unduly hard on the taxpayers."

Besides criticizing spendthrift policies of the military arms as a whole, the committee declared that the military budget is in need of a major overhaul. For instance, some 85,000 tanks were produced in the U. S. during the war. Army statistics, obtained by the committee "with some difficulty," indicated that about 25,000 of these were on hand at the end of the war. Yet the Army could account for only about 16,000 tanks and was unable to state what had become of the others.

Nor was the committee satisfied with our "present position in regard to the manifold and difficult problems presented by new and unconventional methods of warfare and by the development and preparation of measures for psychological warfare and against the mass destruction weapons of biological, chemical and radiological war."

Nevertheless, the report noted "encouraging evidence" of progress. One of its most important single recommendations is that the authority of the Secretary of Defense be clarified and strengthed. All appropriations for the Air Force as well as for the other services would have to be approved by the Secretary of Defense.

Every effort would be made to foster teamwork and coordination throughout the National Security Organization. An air academy is seriously considered but before it is established, the committee urges a complete and thorough examination of the entire field of education of military officers, including West Point and Annapolis.

★ Stop Public Relations 'Pleading'

Inter-service rivalry should be lessened. The committee condemned publicity expenditures which are used for "special pleading" by the Air Force, Navy and Army. Transfer of officers between the several military services would be made easier.

The committee was also critical of the "inadequate liaison" that still exists between U. S. foreign policy and national military power. We have not yet learned that military force is only a means of carrying out national policy—we have won two wars, only to lose the peace both times through lack of clear (*Continued on page 76*)

☆

As the Cold War continues, a Hoover Commission 'Task Force' bluntly evaluates the nation's air policies and drafts a new blueprint for U. S. military aviation

☆

FERDINAND EBERSTADT, Committee Chairman

THE BIG HAIRY DOGFIGHT

IT WAS the day the infantry Marines took Iheya Shima. Four Marine *Corsairs* of the famed "Death Rattlers Squadron" took off from Okinawa to cover the landing.

For an hour they flew overhead, watching the landing through broken clouds. Then their base radioed instructions to head full speed to a spot above the thick overcast where Jap planes were coming in.

The four *Corsairs* hurried to the spot. Cy Dolezel was in the lead, with Charley Drake on his wing. Al Wells led the second section with Jerry Connors flying right wing on him.

Above the overcast were 24 Jap planes, looking the four *Corsairs* right in the eye, mean-like. What happened then is the story of The Big Hairy Dogfight:

Cy DOLEZEL SAID: "We broke out of the overcast at 16,000 feet, like a swimmer coming out of murky water into the bright sun. Dead ahead and 2,000 feet above us was what looked like the whole Jap Air Force. The thought flashed through my mind they were Navy *Hellcats* because they were flying such beautiful formation. Then I saw those big rusty meatballs, covering the whole wing tip. . . ."

"I knew them the minute I saw them," said Jerry Conners, "and I remember saying to myself 'Holy Cow'!"

"They were too pretty for ours," said Al Wells. "There was an old saying: 'If it's beautiful, it's a Jap' and these were beautiful. Clean planes, not a bump nor an awkward line. Smooth round noses, slim fuselage, everything

WHERE ARE THEY NOW?

Lieutenant Cyril A. Dolezel

A post office employee in East Jordan, Mich., Dolezel says his future plans 'are vague indeed.' He left the service at San Diego, Calif., in 1945, having received the DFC for participating in the 'Big Hairy Dogfight.' He is unmarried.

Lieutenant Jerry Connors

An Indiana State Police officer, Connors is now studying law in his free time. After leaving the Marines in 1946, he attended Gary (Ind.) Junior College and Indiana University. He received the DFC for heroism in the action over Iheya Shima.

Lieutenant Charles W. Drake

Personnel division manager for a Newark, N. J., transportation company, Drake attended Dartmouth College after the war. He was discharged in 1946 with the DFC, Navy Cross and two Air Medals. He is a member of the Naval Reserve (Inactive).

By

HAROLD H. MARTIN

faired in smoothly, slick and clean as a whistle."

Charley Drake broke in: "That's right. Funny thing, but the Jap seems to try to express the same perfection of line and detail in his fighter planes the Jap artist does in these funny paintings—you know, every tiny little thing perfect and sort of delicate and beautiful. . . ."

Cy Dolezel said: "Everything but the camouflage. That's ugly. A sort of fishbelly bluish gray below and a muddled blending of brown and green on top. Well, anyway, pretty or not, there we were and there they were looking down our throat with speed and altitude in their favor and us hanging on our props still in the climb. Maybe we should have ducked back for the clouds and run like hell, but that would have turned our (*Continued on page 77*)

Lieutenant Albert P. Wells

A pilot for Standard Airlines, Wells attended several flight schools on the GI Bill after leaving the service in 1946. He 'married the girl back home.' Wells is holder of the DFC with a gold star and the Air Medal with gold star. He is in the Reserve.

Above the overcast, 24 Jap planes waited for the four Marines. Then they pounced

A BUSINESS PILOT'S REPORT

Cheaper Than Driving

By SI LUND

Associate Professor of Education, University of California

University professor finds he can save one-third of travel expenses by flying in rented lightplanes.

Si Lund, now on University of California faculty, saved $139 in 3,814 miles of flying for Oklahoma school in 1948.

AS A professor of education at the University of Oklahoma last year I did considerable official traveling. I made substantial use of my pilot's license by renting a personal airplane and flying instead of driving my own automobile. My flying was particularly encouraged by last year's change in Oklahoma's laws allowing the use of rented or chartered airplanes.

So I flew whenever weather permitted, which is most of the time in Oklahoma. I rented a variety of airplanes for official travel on university business, including the Piper J-3, *Taylorcraft*, Luscombe, *Ercoupe*, Cessna, *Swift*, *Navion*, *Bonanza*, PT-19, and so on. However, I made enough trips to figure good average costs only in the Cessna 120 and 140. I believe these cost figures, which are presented below, would show little change with additional trips.

I made 17 consecutive cross-country round trips in nine different Cessnas. In most cases I paid a rental of approximately $8 per hour. In a few cases I paid an equivalent of six cents per highway mile. Actually, the latter method of figuring has brought the operator slightly more money so far.

WHY RENTED PLANES ARE CHEAPER THAN CARS

(Cost comparisons of official travel on 17 cross-country trips)

	Airplane	Auto	Airplane Savings
Distance	3,814 miles	5,068 miles	1,254 miles
Traveling time	36 hr. 7 min.	109 hr. 14 min.	73 hr 7 min.
Total time (includes to & from airports)	46 hr. 20 min.	109 hr. 14 min.	62 hr. 54 min.
Cash cost to state[1]	$321.30	$303.08	$−18.22
Imputed cost[2]	115.75	273.08	157.33
Total cost to state	$437.05	$576.16	$139.11
Average ground speed (air time only)	105 m.p.h.		
Average ground speed (total time)	85 m.p.h.	46 m.p.h.	39 m.p.h.

[1] Cash cost is based on 6 cents per mile for automobile and regular rental plus taxi costs for the airplane.

[2] Imputed cost is cost of personal time lost while traveling at rate of $2.50 per hour.

On these 17 trips, my plane travel actually cost only $18.22 more than it would have cost to drive my own car—a mere six per cent.

But I don't think I'm giving a false impression of cost when I say my time is worth something too. My total time, including going to and from airports in making these 17 trips was 46 hr. 20 min. If I had driven, my time would have been 109 hr. 14 min. So I saved 62 hr. 54 min. Figuring my time as being worth $2.50 per hour, I saved $157.33 in time. When I add that to my actual travel cost, it was $139.11 cheaper for me to fly than to drive. That's nearly one third.

My average ground speed was 105 m.p.h. Counting time going to and from airports, my average ground speed was still 85 m.p.h. In addition I had to fly only 3,814 miles. If I had driven instead, I would have had to cover 5,068 miles.

Oklahoma's new regulation is exceptionally favorable for private pilots. It allows reimbursement for all flying, except over commercial airlines, at the standard automobile rate of 6 cents per mile, highway distance, plus the difference between the per diem cost when flying as compared with the per diem cost had an automobile been used, plus any taxi costs incurred in traveling to and from airports.

The state is making money on this deal, as a close study of the accompanying table clearly shows.

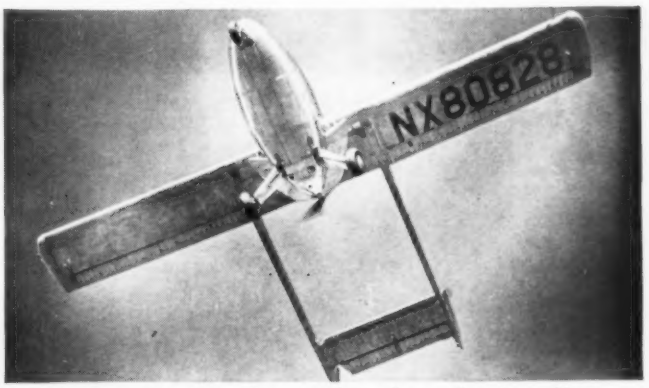
There's another thing I'd like to point out in interpreting these cost figures. They are somewhat unfair to the Cessnas' ground speed (total time) because the average distance of the 17 trips is only 224 miles round trip. A more favorable result would have been achieved if the average trip had been closer to 500 miles.

The automobile figures are based on records I kept of several hundred thousand miles of official travel during the past 20 years. I should say they are correct to within two per cent. For nearly all of these trips I have actual figures showing the same trip made at some time by automobile. The figures don't, however, include the great saving in terms of personal wear and (*Continued on page* 62)

.....HAVE YOU SEEN?

Bonanza with wing tip tanks was used by Capt. Bill Odom in unsuccessful attempt to fly non-stop from Honolulu to New York City. Bad weather over Rockies forced Odom back to San Francisco but he still set distance record and believes flight is feasible.

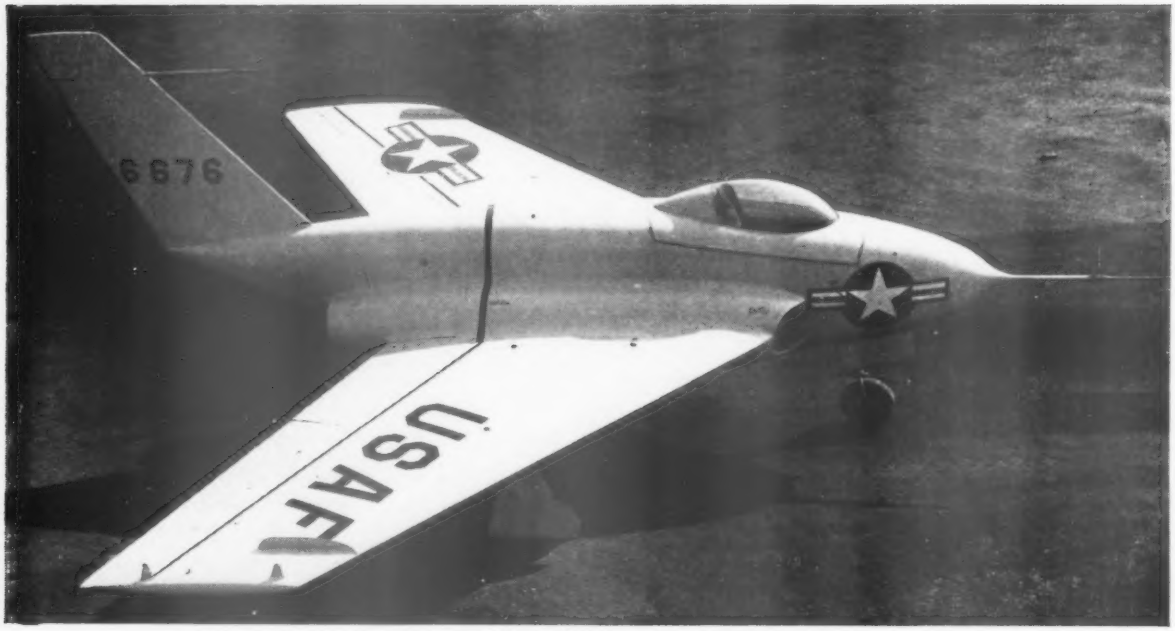
Ercoupe Club-Air is "2½-place" deluxe 1949 model with junior seat for 75-pound child, new interior design.



New view of Anderson, Greenwood two-place pusher gives odd appearance. It has logged over 230 hours, finished most CAA tests.

New model Cessna 170 has tapered all-metal wing, a single lift strut and a dorsal fin. The plane has more sensitive ailerons and redesigned elevator control system to reduce control loads at landing. Fuel capacity is being increased. fuselage soundproofed.

HAVE YOU SEEN? *continued*



New view of Northrop X-4 shows striking configuration of this semi-tailless type with swept wings. The plane is about 20 feet long, has span of 25 feet. Controls are similar to other Northrop wings. X-4 is a subsonic research plane with pilot ejection seat.

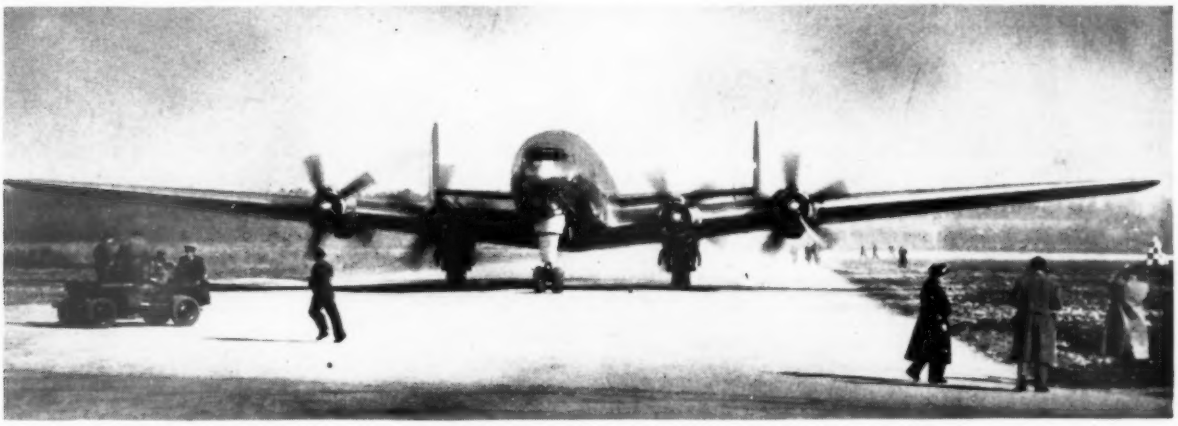
Martin Mauler is one of squadron operating on USS Kearsarge. With 2,000-mile range, Mauler is largest carrier aircraft.

Douglas AD-2 is advanced model of standard AD series, nearly 500 of which have been built. Note the fuselage dive brakes.

Prototype of Fairchild C-119 Packet (the C-82 is no longer in production) has wingtip radomes, much larger fuselage.

New Air-N-Oil shock absorber, installed on Piper Cub, uses compressibility of oil and air to absorb plane-landing shocks.

Rocket-launched target plane, the OQ-19A closely resembles a normal-sized pursuit craft at 200 yards distance. With top speed of 220 m.p.h., it is capable of high-speed acrobatics by remote control. Rocket boost gives it 80 m.p.h. at end of 60-foot catapult.



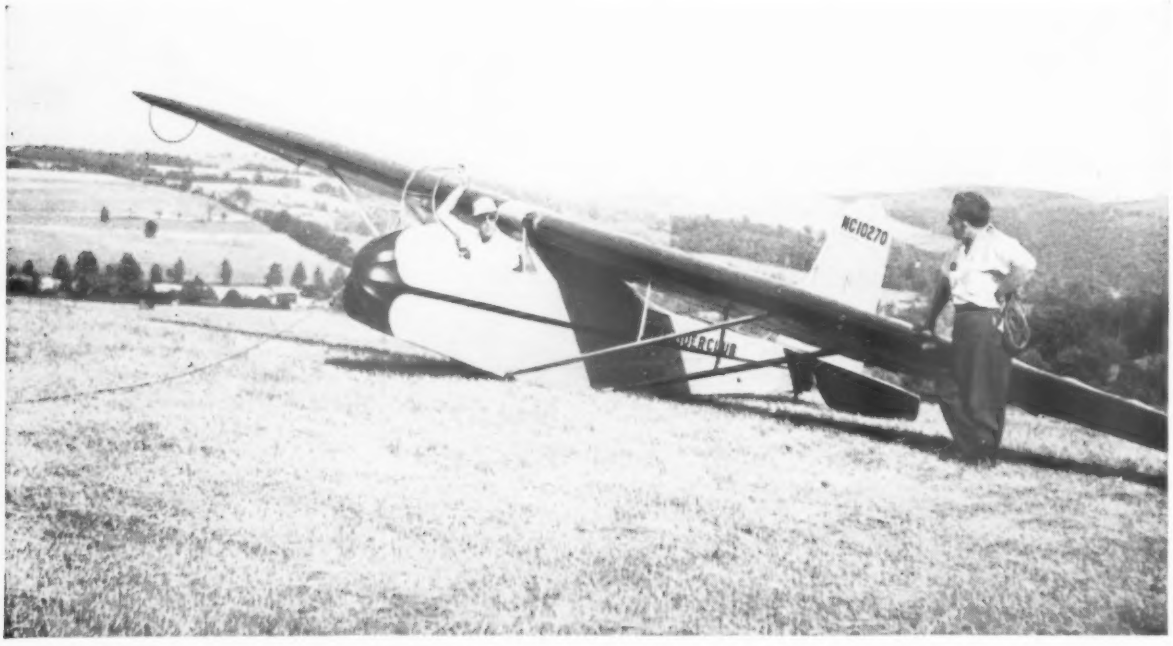
New Italian four-engined transport built by Breda Zappata lands at Gallarte airfield, near Milan. Tricycle-geared plane has twin rudders, exceptionally clean lines. This is one of several new transport planes being developed in Italy since the war.

Percival Prince is light British 6-10-place transport. It has tricycle gear. Power is two 520-h.p. Alvis Leonides engines.

Vickers Seagull has contraprop for lower engine mounting. Wings, which have variable incidence, fold for carrier stowage.

I Learned About Flying From That! NO. 112

Before flight, author waves to bystanders. He wrecked his glider but learned to respect turbulence, gusts.



He put his glider into a steep dive—and found he was climbing!

By WESLEY B. HAMMOND

THE sailplane was nestled neatly in the trailer hitched behind my auto as I drove toward Elmira, N.Y., bound for the "hill" and perhaps a little soaring. My hopes weren't high. Several weekends past I had driven to Elmira and, after assembling the glider, had sat around for hours with the wind refusing to play the game.

I pulled into Elmira at dusk, parked the car and spent the night in a small hotel. By dawn I was up on the hill, putting the glider together. I was the first person there, and had to do the job alone.

As I was giving the plane a final check, a beautiful northwest wind (the essential direction) had blown up. The clouds looked a little ominous, with strato-cumulus booming up over the hill at about 2,000 feet. But I wanted to get into the air.

In about 30 minutes a carload of glider enthusiasts bumped up the slope in an old jalopy. They were typical members of the gliding fraternity, ready to lend a hand. Soon we were pushing my plane out, hitching the tow-rope. The wind was brisk as they hauled me up.

Climb was swift, and the sailplane reached the end of the tow line before I arrived over the brow of the lower end of the slope. I didn't release, because I'd previously experienced a "sink" which is prevalent behind the brow. As I passed the release point I glanced at the altimeter: 300 feet.

I flew to the end of the ridge, then turned back towards the field. When I again reached the take-off point, I had 1,800 feet, and the rate-of-climb indicator showed 10 feet per second, up. Ridge soaring is usually rough but on that flight it seemed unusually so. In about 30 seconds I reached a decision: No more soaring for the present. I was ready to land. So I turned downwind behind the hill and into the "sink" present behind the high wind. Then I S-turned in for a landing. When I climbed out of the sailplane I glanced at my watch and noted I had been up for 30 minutes.

About an hour later I made a second flight. The air was even rougher. My plane cruised at 38 m.p.h., stalled at 30 m.p.h. On that hop I spent most of the time stalling between gusts. When I landed I decided to call it a day—and walked the plane into the hangar.

I sat around with a group of men who were watching.

"I don't know—looks like I'm dogged by bad luck," I commented. Then I recounted the sad tale of my numerous trips to Elmira, and the way wind and weather conspired to keep me out of the air. As I talked, I got more and more angry at the thought of those fruitless trips.

"Believe I'll try just one more flight," I remarked.

Several raised eyebrows and dubious glances showed me that I might be making a mistake.

I turned to a tall young lad (*Continued on page* 68)

Here's How You CAN GET AIRLINER PERFORMANCE from your Business Plane Automatically with AEROMATIC® PROPELLERS

Any plane from 75 to 450 horsepower flies better, handles easier, when it's equipped with an Aeromatic Variable-Pitch Propeller. That's because this propeller picks the proper propeller bite for any load, angle of climb, or cruising speed. Thus you get *at least* ¼ shorter take-off, faster climbing to critical* altitude, higher cruising speed and better landing control . . . with lower fuel consumption!

If you own a plane . . . or are considering the purchase of one . . . don't handicap its efficiency with an ordinary propeller! Specify Aeromatic, the only *completely* self-acting and self-contained *automatic* Variable-Pitch Propeller, and you'll get peak performance under all load conditions, just like the airlines do!

For a description of Aeromatic's exceptional performance, see the illustrations here—but for the full facts, write today for your copy of the *free* Aeromatic booklet. Address: Koppers Co., Inc., Aeromatic Propeller Dept., 243 Scott St., Baltimore 3, Maryland.

*For peak performance of aircraft with higher cruising altitudes, Aeromatic Propellers can be equipped with special Aeromatic Altitude Control.

¼ SHORTER TAKE-OFF: Automatically, with the engine at full throttle, Aeromatic Propeller assumes low pitch. Gets plane off ground quickly with full take-off power.

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GREATER CRUISING RANGE AND SPEED: Automatically maintains the best pitch for top cruising on minimum fuel at any level up to critical altitude.

SAFER LANDINGS: Automatically adjusts its pitch for long, flat glide. Moves to low pitch instantly for a quick pickup if pilot overshoots the field.

TYPICAL COMMENT: "I'm enjoying many hours of happy flying with the AEROMATIC on my BELLANCA demonstrator . . . the combination surpasses anything!"

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Aeromatic

The propeller with a brain KOPPERS *for your personal plane*

Air-Controlled Automatic Propeller—Licensed under Patents of Everel Propeller Corp.

AEROMATICS are available for these planes . . . are being approved for other makes and models:

STINSON VOYAGER, FLYING STATION WAGON & L-5 • GRUMMAN WIDGEON PIPER SUPER CRUISER & FAMILY CRUISER • FAIRCHILD 24 • BELLANCA CRUISAIR CESSNA 120, 140 & 165 AIRMASTER • RYAN NAVION • SWIFT 125 • ERCOUPE also available for numerous foreign models

AOPA NEWS

Aircraft Owners and Pilots Association is a service organization for the private pilot or aircraft owner. AOPA's full time staff is devoted to helping the individual pilot. Its aim is: "To make flying more useful, less expensive, safer and more fun."

Headquarters are: 15th and New York Aves., Washington 5, D. C. Members also receive a special AOPA edition of FLYING, newsletters and confidential aviation data. Opinions expressed in this column are not necessarily those of FLYING MAGAZINE.

GCA AGAIN

Latest boost for GCA—and one of the most effective in recent months—was the decision by President Truman's pilot to bring the *Independence* down into Washington National Airport on December 29 in weather that caused airliners in the area either to pass up Washington, or circle until the weather improved. Thus, in one quick operation, a telling blow was dealt to the airline and CAA interests who have held out against GCA, over the objections of AOPA, Air Force and Navy.

Following the GCA landing of the plane carrying the President and his family, J. B. Hartranft, Jr., AOPA general manager, issued a statement to the press which said, in part:

". . . For the past several years the controversy over the relative merits of GCA over ILS (instrument landing system) has raged within the aviation industry, with the domestic airlines and CAA holding out single-handed in favor of ILS, while the Air Force, Navy and private flyers—by far the vast majority of the users of the country's airways facilities—have decided unanimously in favor of GCA. . . .

"The President's pilot is an Air Force pilot: to him GCA is considered quite routine and safe. It was safe enough for the President of the United States. And a Navy transport followed the *Independence* in on GCA. Yet there were at least two airline aircraft holding over Washington at the same time, awaiting better weather so they could use the ILS at Washington airport. And two other airliners passed up Washington, landing their passengers at some other city, to be sent back to Washington by train. . . .

"At the time the President's plane made its GCA approach, the visibility was $\frac{3}{8}$ of a mile—below the safe minimum limits for ILS. Even after the *Independence* landed, control tower operators could not see it out on the airport . . ."

Mr. Hartranft's statement also cited the two-month record of the use of GCA on the Berlin air lift. Further details are in the AOPA PILOT.

ZERO READER

Private pilots have been given an exaggerated impression of Sperry's new experimental Zero Reader, following a recent rush of glowing articles about the instrument. AOPA is advising members that this instrument is many years away for personal planes; the simple appearance of the indicating instrument is misleading. The Zero Reader merely repeats and coordinates signals received from other instruments in the plane. Cost and weight of the equipment will be so high for a long time to come that AOPA national headquarters is advising members to forget about it for the time being.

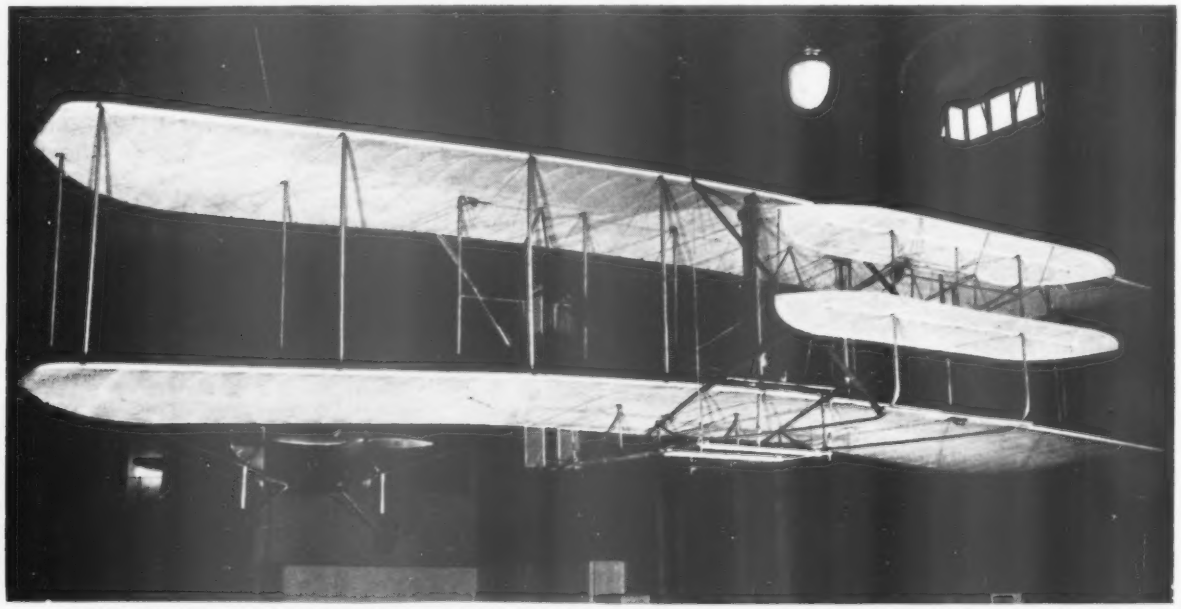
CROSS-COUNTRY SERVICE

AOPA's cross-country routing and advisory service is rapidly becoming one of the busiest branches at national headquarters. AOPA has voluminous files with airport, routing and facilities information—a surprising amount of which comes to national headquarters from AOPA members throughout the world. One recent voluminous report on airports, facilities and charges came in from a member in Italy. And a group of AOPA members in Panama recently turned out to help a pilot-member from the States, after his tachometer broke down. One Panamanian member fixed the tach while the pilot slept, then the rest got together a party for him with most of the other AOPA pilots in the area.

OMNI

If the mail at national headquarters is any indication, there's a tremendous interest stirring in omni-directional radio equipment for personal planes. AOPA continues to report omni-developments to members, but it's still too early to give conclusive advice on the types of equipment available to the private owner. To AOPA's knowledge, only two omni installations for private planes are in production.

Members are advised to watch the AOPA PILOT and Confidential Newsletter for reports on omni-equipment as it becomes available. END



The Wright plane comes home. Formal ceremonies of acceptance were held at the Smithsonian Institution in Washington December 17—anniversary of Wright Brothers first flight. J. B. Hartranft, Jr., AOPA manager, was a member of accepting committee.

Announcing the new

Ryan Navion

for '49

STILL HIGHER PERFORMANCE FOR '49

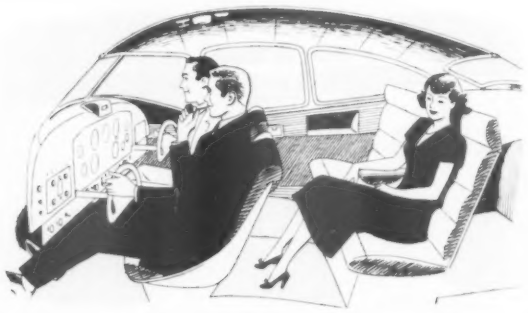
Cruising speed, up to	155 mph
Take-off distance over 50' obstacle, down to	875 ft.
Landing distance over 50' obstacle, down to	875 ft.
Ceiling	15,600 ft.
Climb (first minute), up to	900 fpm

Above performance has been demonstrated on standard '49-type Ryan Navion. Take-off, landing and climb figures are with zero wind, sea level and full gross load of 2750 lbs.

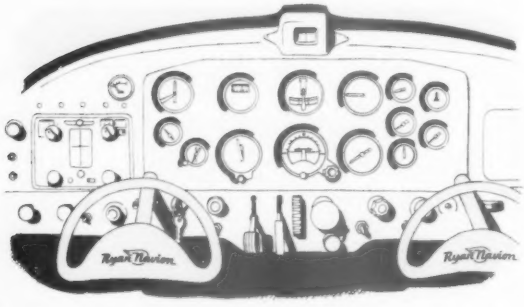
Featuring 29 dramatic new improvements for '49

Higher performance highlights 29 exciting new advancements in quieter, still more dependable, safe and useful Ryan Navion fe

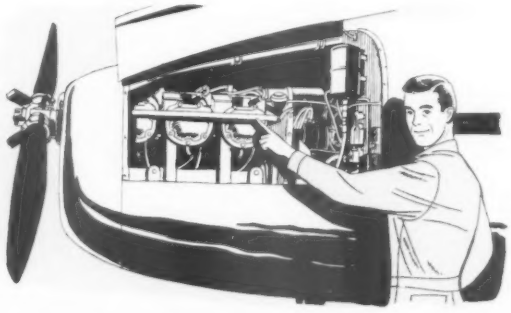
New! **GREATER SPEED AND PERFORMANCE** in the vastly improved '49 *Ryan Navion*. New 205 h.p. engine rating plus sleek new landing gear fairings and doors speed the *Ryan Navion* through the air at a new, faster 155 m.p.h. cruising speed. Sensationally shorter take-off run of only 560 ft., and only 875 ft. take-off to clear a 50-ft. obstacle. Normal landings are made under 50 m.p.h. with average loads.



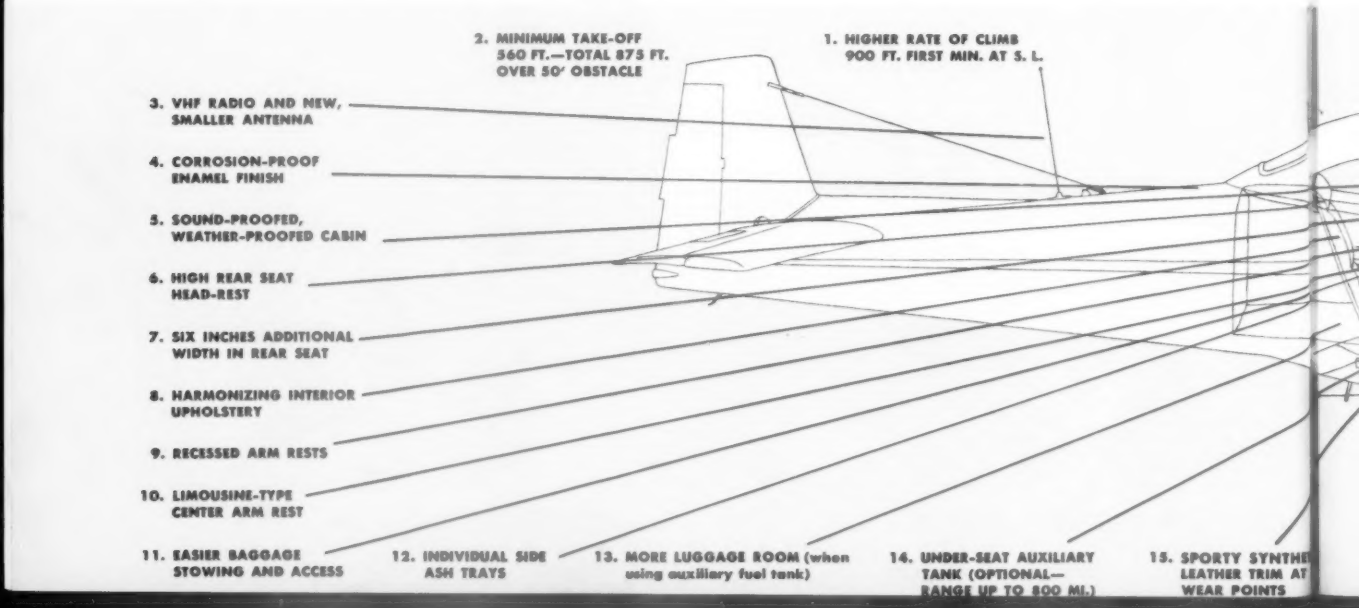
New! **STILL MORE ROOM AND COMFORT** in the tastefully appointed cabin. Wider foam-rubber-cushioned rear seat with limousine-type folding center arm rest, plus high, rolled head rest, assures hours of relaxing comfort on the longest flight. Four individual side ash trays, recessed arm rests, soothing upholstery colors bespeak thoughtful planning for *you*. You'll *always* ride comfortably in a *Ryan Navion*.



New! **INSTRUMENT AND CONTROL PANELS** arranged for easier "scanning." Manifold pressure and dampened fuel gauges now included. Panel and gear position lights can be dimmed. Standard panel cutouts adapt to gyro installation without costly alteration. New control panel features knobs which simulate mechanism they activate for positive identification. Partial flap settings and key-ignition are new.



New! **EXCLUSIVE DUAL FUEL SYSTEM** places the *Ryan Navion* with modern airline and military aircraft for dependability. Engine-driven vane-type pump provides proper fuel supply under all normal operating conditions. An electrically driven auxiliary fuel pump is also provided. Pumps operate together or independently. No personal airplane can be flown with more confidence than the 1949 *Ryan Navion*.

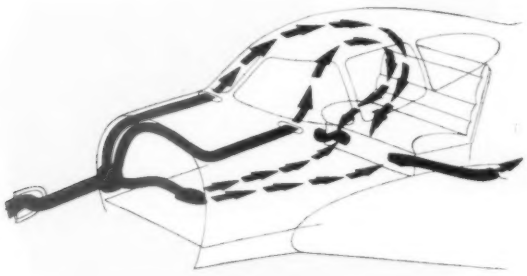

2. MINIMUM TAKE-OFF 560 FT.—TOTAL 875 FT. OVER 50' OBSTACLE
1. HIGHER RATE OF CLIMB 900 FT. FIRST MIN. AT S. L.
3. VHF RADIO AND NEW, SMALLER ANTENNA
4. CORROSION-PROOF ENAMEL FINISH
5. SOUND-PROOFED, WEATHER-PROOFED CABIN
6. HIGH REAR SEAT HEAD-REST
7. SIX INCHES ADDITIONAL WIDTH IN REAR SEAT
8. HARMONIZING INTERIOR UPHOLSTERY
9. RECESSED ARM RESTS
10. LIMOUSINE-TYPE CENTER ARM REST
11. EASIER BAGGAGE STOWING AND ACCESS
12. INDIVIDUAL SIDE ASH TRAYS
13. MORE LUGGAGE ROOM (when using auxiliary fuel tank)
14. UNDER-SEAT AUXILIARY TANK (OPTIONAL—RANGE UP TO 800 MI.)
15. SPORTY SYNTHE LEATHER TRIM AT WEAR POINTS

in the roomier, for 1949!

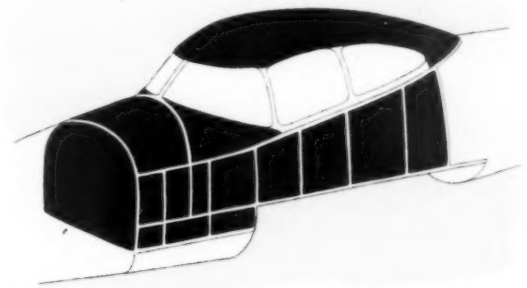
TO THOSE who would take to the skies this year, we proudly present the new *Ryan Navion*. Luxury-liner in the personal plane field, it is a thoroughly proven postwar airplane . . . now, even more versatile and powerful than ever before. Now, even faster, roomier, more comfortable. We invite you to see the new, 1949 *Ryan Navion* soon. Check its 29 new features for '49. Compare it "against the field." You are sure to agree that this year "It's *Ryan Navion* Again."

***New!* MORE ACCESSIBLE, ROOMIER LUGGAGE SPACE.** Even easier to load luggage! Just fold forward one or both of the hinged rear seat backrests! Want to work while flying? Your portfolio is at your fingertips. Auxiliary tank (optional equipment) is built under rear seat, so luggage space is *all* luggage space. You can carry up to 180-lbs. in the 20-cubic-foot compartment . . . that's *eight* men's two suiter bags!

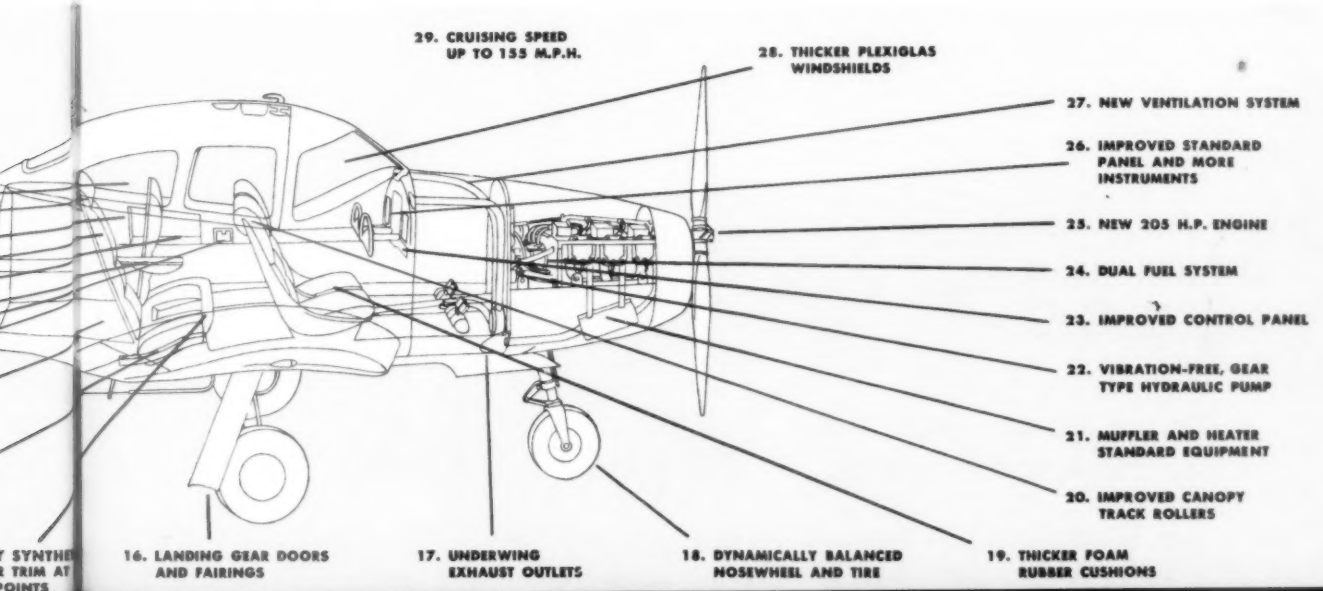
***New!* POWERFUL VHF RADIO** adds the ultimate touch to worry-free, fatigue-free flight. VHF transmitter covers 6 channels; assures instant contact at distances up to 100 miles while flying at 10,000 ft. Clear, reliable reception of standard broadcasts, four-course ranges, marker beacons. Standard tower frequency clearly marked on dial. You "get through" while sending. High fidelity reception is assured.



***New!* VENTILATING AND HEATING SYSTEM** provides living room comfort. Still more draft-free fresh air is now channeled to every corner of the cabin. Ryan exhaust system specialists have designed an efficient combination heater-muffler which is now standard equipment. Engine noise in cabin is materially reduced. Simple temperature controls keep the '49 *Ryan Navion* cabin "just right" for every occupant.



***New!* PERFECTED "ALL AROUND" SOUND INSULATION** cradles the *Ryan Navion* cabin in a thick blanket of noise and heat-repelling Thermo-Cousti Fiberglas. This insulation material is all-around . . . on canopy, cabin sides and firewall . . . shuts out both noise and heat. Engine exhaust is now muffled, and discharged under the wing. Thicker windshield deadens propeller noise; Plexiglas filters out sunburn rays.

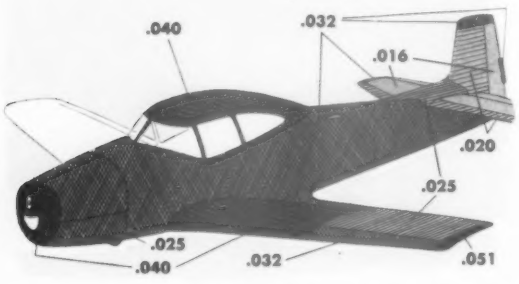

29. CRUISING SPEED UP TO 155 M.P.H.
28. THICKER PLEXIGLAS WINDSHIELDS
27. NEW VENTILATION SYSTEM
26. IMPROVED STANDARD PANEL AND MORE INSTRUMENTS
25. NEW 205 H.P. ENGINE
24. DUAL FUEL SYSTEM
23. IMPROVED CONTROL PANEL
22. VIBRATION-FREE, GEAR TYPE HYDRAULIC PUMP
21. MUFFLER AND HEATER STANDARD EQUIPMENT
20. IMPROVED CANOPY TRACK ROLLERS
16. LANDING GEAR DOORS AND FAIRINGS
17. UNDERWING EXHAUST OUTLETS
18. DYNAMICALLY BALANCED NOSEWHEEL AND TIRE
19. THICKER FOAM RUBBER CUSHIONS

Big, Rugged, Fast, Safe and Easy-to-Fly

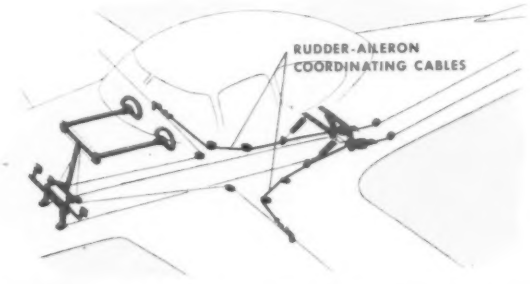
Ryan Navion offers Plus Features which make it America's outstanding business and personal plane

MORE ROOM. Exclusive *Ryan Navion* canopy rolls back a full 21½-ft. to provide easier entrance and exit for both front and rear seat passengers . . . there's plenty of head room for all . . . you can conveniently change seats in flight if you wish. And the generous cabin accommodates four big people comfortably . . . with lots of room to stretch out and relax. Front seats adjust to individual requirements. Canopy locks partially open for best ventilation on ground. For half-ton cargo, three seats are quickly removed; canopy can be slipped off.

MORE SPEED—MORE PERFORMANCE in the more versatile more useful new *Ryan Navion* . . . fast, "big plane" cruising even in rough air without sacrificing safety and comfort . . . short, smooth landings and quick take-offs when fully loaded, even from improvised or high altitude fields. You get there three times faster than by surface travel . . . at costs comparing favorably with your automobile. Owners say, "No other plane combines so well, such an intelligently chosen and well-engineered combination of features as the *Ryan Navion*."



RUGGED CONSTRUCTION. Rhino-tough heavy gauge all-metal skin that's dent and wrinkle resistant for unsurpassed durability and structural integrity . . . for easy maintenance and permanent beauty. Rugged tricycle landing gear features oversize wheels and tires, husky deep-stroke hydraulic shock absorbers. Wide wheel tread, powerful equalized hydraulic brakes and big, steerable nosewheel make for easy ground handling . . . large, slotted, full-deflection flaps for short, pillow-smooth landings on rough fields even in strong cross winds.



SAFE, EASY-TO-FLY. Patented, inter-connected ailerons and rudder give selective, "two-control after take-off" . . . your *Ryan Navion* literally flies itself over long periods. Gentle and well behaved, the amazingly stable *Navion* "forgives" most anything short of foolhardiness. Smooth riding, always . . . positive, yaw-free, directional stability. The stall-resistant wing gives full aileron control even *below* stalling speed for maximum safety in slow flight and landings. Seven big windows wipe out blind spots; give wonderful visibility.

FLY . . . AND BUY . . . THE '49 NAVION NOW! Discover the comfort, confidence and satisfaction that comes with a *Ryan Navion*. Write Ryan Aeronautical Company, San Diego, California. Arrange to take your next business trip FREE. No obligation.

Available in four new, still more beautiful colors with harmonizing interiors. Fine synthetic enamel finish is completely corrosion-proof; stays beautiful and insures low maintenance cost

TAMPICO RED | ITALIAN CREAM | LUCERNE GREEN | CHEVRON BLUE

NO OTHER PLANE COMBINES SO MANY FEATURES SO WELL

Ryan Navion

RYAN AERONAUTICAL COMPANY · SAN DIEGO, CALIFORNIA · RELY ON RYAN

Relativity

(*Continued from page* 35)

airplane flown by a good intelligent pilot while making a normal landing in good weather? The figures show there must be.

Very often the pilot is able to testify later on as to what went on. "I don't know what happened," he says. "We were coming in in a perfectly normal glide and just as I was getting ready to flare out, whop! we were on the ground. I had glanced at the air speed a moment before and it was 110 and that's the standard for this ship. I can't make it out."

The official finding usually was that the pilot came in too low and slow, that he stalled the plane, although in most cases it would be nearer the truth to say that the plane cracked up the pilot rather than that the pilot cracked up the plane. No one seemed to know why this pilot, like so many, had stalled on the approach. There are very few people yet who know why such things happen. The strangest observation of all is that it is generally the smarter pilot, especially the one who has a degree in physics, who holds what could be called the soundest misconception about the phenomenon.

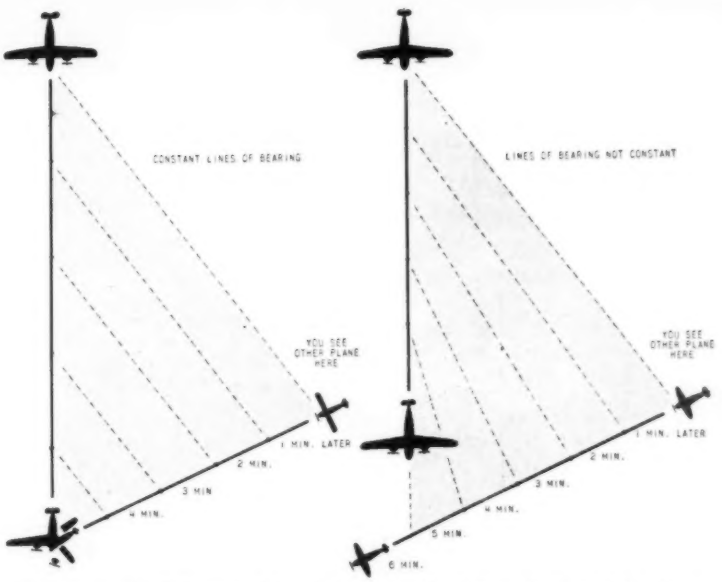
This hazard is so important to all pilots who would be less rather than more temporary, that a little historical background would be helpful.

During the War to End War, when the low-powered thin-winged planes were always flying on the edge of a stall, a good many of them spun into the ground from turns. Some brainy simpleton launched the hypothesis that it was dangerous to turn from flying up-wind to flying down-wind because the airplane had to pick up so much speed, although it was quite safe to turn from flying down-wind to flying up-wind because the airplane had lots of speed when flying down-wind.

This hallucination became very popular indeed, and if anyone questioned it, he was at once an intellectual untouchable. Some fancy pilots, who delighted in dainty refinements of technique, when flying in a cross wind would not fly level but would keep one wing down—the wing that was on the side that the wind was coming from—so that the airplane would push against the wind that was pushing against the side of the airplane.

The few people who had an insight into the principles of physics pointed out that it did not make the slightest difference in the forces acting upon the airplane whether it turned up-wind or down-wind; that when the airplane was airborne there wasn't any wind except that of the motion of the airplane through the air mass. All velocities and all kinetic energies were relative. They called attention to the fact that an airplane, if in the United States, say, was going east at the rate of around 900 m.p.h. anyway, due to the rotation of the earth, and some 32,000 m.p.h., I think it is, or a good clip anyhow, due to the revolution of the earth around the sun.

The idea that when the airplane is airborne there is no wind that puts any force upon it became generally accepted



Will you collide? Diagram (above) shows graphically how the lines of bearing to approaching plane are constant on a collision course, and vary on a non-collision course.

HIT OR MISS?

By Alice S. Fuchs

THE CRUMPLED REMAINS of the two planes chalked up one more digit in the statistics column, "Mid-air Collisions at Night." There was little evidence to indicate cause of the collision, but persons who found the wreckage shook their heads:

"Funny—all that space up there and these two had to try to use the same part of it at the same time! Can't those pilots *see* each other?"

Granted that many collisions occur because the pilots did not see each other, there is every possibility that some of them did see each other but misinterpreted what they saw. A simple rule might have saved their lives.

Imagine yourself flying on a dark, moonless night. Suddenly a green light appears through the left side of your windshield. You have the right of way, but that fact should be of minor interest to you. Several questions cross your mind. How far away is that light? Does the other pilot see you? Will he pull out of your way? Most important of all, will you collide if you maintain your present course?

Here is a simple rule to solve your difficulties. Pick a spot on your windshield near the apparent position of the airplane. If the other airplane moves in relation to that spot, it is not flying in such a way as to hit you. If the airplane does *not* move in relation to the spot on your windshield, you are flying an intercepting course and will surely collide unless you or the other pilot alters course, airspeed or altitude.

The truth of this test will be apparent to anyone who has worked a simple interception navigation problem, the solution of which depends on lines of constant bearing. No matter what the airspeed and course, if the line of bearing to the other aircraft remains constant the windshield spot will appear in the same relation to the aircraft and the two planes will collide.

In applying this principle you must be sure to keep your head still when estimating the relative motion of the other plane. Obviously, head motion will result in apparent motion between the other plane and the windshield, and the apparent shifting of the line of bearing may give you a false sense of security.

Two exceptions to the rule are:

(1) If the other aircraft is flying along exactly the same course as you, at the same airspeed, it will remain aligned with the spot on your windshield without danger of a collision.

(2) If the other plane is so near that collision is a matter of seconds, it may appear to move across your field of vision and yet will collide with you.

A basic rule, regardless of the "windshield test":

Always keep a healthy distance away from other craft. A near miss is not as good as a mile in the eyes of CAA.

LOGGING TIME

WITH HY SHERIDAN

Captain, American Airlines

LAMB A LA RAND MCNALLY

Are you a fast eater? To the illuminati of American Airlines this looked like too good a pun to miss.

Now when you are served a dinner on the DC-6 you get a little souvenir menu which tells you how many miles you are likely to go while conquering each dish. You will take 60 miles to eat the salad, for example, provided you are a gentleman. If you are a pig you can do it in 30 miles even with a tail wind, but the company assumes that you are a gentleman, on what grounds beats me.

Anyway it is an amusing idea, and I have seen a passenger get out his watch and, knowing the ground speed after having inquired of the stewardess, measure his vittles more or less like a surveyor might. Many a passenger has covered Ohio with a single AAL steak. But humor is dangerous, as your modest reporter can tesify.

Like when Mrs. Oola Oppenheim got a telegram from her new and yet fond spouse who was on his first trip to New York City. "MISS YOU BADLY ATE HUNDRED SEVEN MILES MACARONI. JAKE."

* * *

Tinkle, tinkle, little ice—
You're the only kind that's nice.
—Nursery Rhyme from
Sheridan's Kiddie Shockers.

* * *

THE ZERO READER

So many people have asked me why the Zero Reader works and what is the simple principle that gives it its magical qualities that I had better do something about it right here. They couldn't tell from my *Post* story, I guess. Sadie read it and she said that I have the knack of explaining a thing so that it is perfectly oblivious.

When a pilot comes in by eye to land he curves his airplane around until he is lined up with the runway. The pilot's eye measures the angle between where he is and the direction of the runway that he lands on. The pilot curves around and as he gets closer and closer to the lined-up position, he eases off the turn. When the angle is big the pilot takes a big bite out of it, and when it is little he takes a little bit out of it. That is what the Zero Reader does.

The Zero Reader measures the angle. Then it has a built-in ratio for taking the angle off, and this, simplicity itself, brings the airplane around in a smooth, easy, tapering curve to the lined-up position. Suppose the original angle is 32°, and the built-in ratio is a divisor of four; the next position of the plane is eight degrees off, the next two degrees, the next a half degree, and the next one-eighth of a degree which is too little to matter.

When you make the instrument read zero you are flying that curve. Suppose you look at your maps and your instrument gets off, it is no matter. When you zero again you are flying a smooth curve to the runway, not the one you previously had, but one just as good. That is why you don't have to pay much attention to the instrument. And you don't have to think.

When you don't have to pay attention and you don't have to think, Shangri-la is here again. I am going to write a play: "All God's Chillun Got Zero Readers."

* * *

THE FAMILY PLAN

American Airlines started a family plan some time ago and it has been such a success that it has been widely imitated. Certain days of the week the passenger loads used to be light; on these days the airlines have provided that when a man buys his own full fare his family can go along half-fare. On these cornucopia days my cabin is filled with females and the usual amatory souvenirs. Now when papa goes away on business mama can go along to see that it is commercial rather than simian.

Mama's going along has cut down on the cut-ups a little, but it has brought some much needed revenue out of otherwise empty seats. One of my half-fare helpmeet passengers the other day was pretty motion sick, although the air was not so very rough, and I stopped to sympathize with her, for I have found that a woman likes nothing so much as understanding unless it is a good beef steak.

"Oh, I hate to fly," the lady confessed, moaning, "but I just can't resist getting something for nothing."

* * *

A GRAVE OFFENSE

Here lies the pilot who loved to pun,
But now the poor man's punning is done;
His hearers dispatched him, then called the hearse
Because he had gone from bad to verse.

in time, even cherished, by the illuminati, who would discourse on it at the drop of a question mark. All speeds were relative. What if the wind suddenly changes when an airplane is coming in to land, for instance, or what if the wind drops off suddenly due to a gust blowing in the same direction that the airplane is gliding, or it drops off due to a wind gradient, blowing much slower near the ground than a little higher up?

What of that? Nothing of it, they say. Velocities are relative, don't you know; no wind so far as the flying airplane is concerned. And there, as Willy Shakespeare would put it, is the rub, and the rub is usually more or less short of the runway, more's the pity. For these soothsayers are wrong; dead wrong, too.

The reason is simple. All velocities and all kinetic energies are purely relative; that is true. But all changes in velocity and all changes in kinetic energy are absolute. We don't need any mathematics to see this. If an object has its velocity changed with respect to one other thing, it has the same change with respect to all other things. Thus if an airplane speeds up 10 m.p.h. with respect to the earth, it speeds up that amount with respect to the stars. The implication is vital.

Consider that you are gliding in to land, headed into the wind like a good little pilot, and when you are 100 feet up the wind is 30 m.p.h. but it is only five m.p.h. on the ground. The air changes its velocity with respect to everything including the airplane, because all changes are absolute. The airplane will lose 25 m.p.h. with respect to the air; actually it is the air that is doing the changing. The airplane retains its velocity and when it gets into the slower air, the airplane does not speed up because, as you recall Newton's law, a body continues with the same velocity unless a force is brought to bear on it. The airplane has inertia.

Usually, changes in air velocity are fairly gradual and the pilot will, having trained reflexes, make the necessary adjustments almost instantly and without being particularly conscious of them. The danger comes in when the change is rather fast, as in gusty air or sharp wind gradients. A heavy airplane may stall and if it does a pilot must buy back his buoyancy with a large payment of altitude, sometimes more than he has on hand.

Our reflexes learn if our minds do not, and as pilots have gained more experience on their aircraft, such as the DC-4, allowance is automatically made for gusts and wind gradients in most cases. It is on blind approaches where the eye-controlled reflexes do not work that we have such tragedies as the one at Shannon Airport in Eire that no one can account for.

And so, Mr. Ranney, please pardon the slight discursiveness here which, I hope, now makes the answers pretty obvious.

1. The airplane will stall.
2. It will not continue its approach in a normal manner.
3. It will lose 40 knots airspeed at the moment the wind stops.
4. The airspeed indicator will show 40 knots slower.

And that, brother, is THE END

PLANE FAX

A page of service tips for private flyers and fixed-base operators

How Glendale's Sky Roamers reduced engine maintenance cost 53%

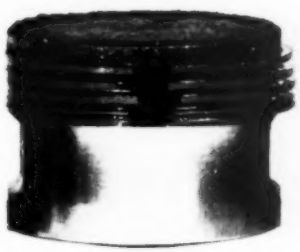
Recently, the Sky Roamers Flying Club of Glendale, California, sent the engine of their Continental 85 Powered Cessna 140 to the shop—*after 1005½ hours service without repair*—for a checkup.

"It was still running quietly, had no stuck rings or valves and was using only one quart of RPM Aviation Oil in eight hours," is the astonishing report of Mr. James H. Brown, secretary-treasurer of the club.

"Our previous Continental 85 engine, using two other aviation oils, stuck rings three times in 798 hours. Engine maintenance cost was $.535 per hour.

ENGINE: CONTINENTAL 85 hp
OIL USED: "R P M"

Ring belt area free of deposit after 1005½ hours —

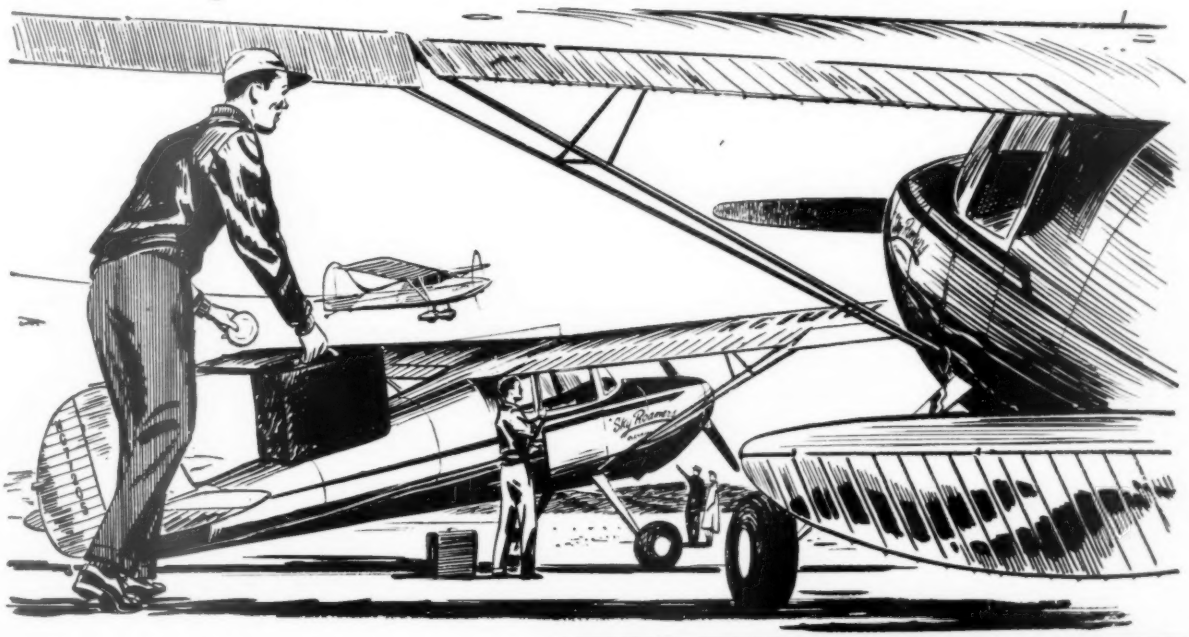


Ran four times longer than the longest run using other oils —

—Prevention of stuck rings and valves gives maximum service at $.248 per hr.

"Using RPM Aviation Oil, with no ring or valve jobs," concludes Mr. Brown, "reduced cost to $.248 per hour."

REMARKABLE, ISN'T IT, how the special detergent in "RPM" keeps belt areas free from deposits? And another compound in "RPM" makes it cling to hot upper cylinder walls . . . left bare and exposed to wear by ordinary oils. Result: "RPM" often *doubles* the period between overhauls!



Handling your brakes correctly?

When you use brakes excessively, without allowing them time to cool they may not hold when you need them in case of an emergency. It's a good idea to always test your brakes while taxiing before take off, and use them as little and as lightly as possible while taxiing. Even more important, inspect them *regularly.*

"We'll take better care of your plane"

CHEVRON AVIATION GASOLINE
RPM AVIATION OIL
Standard Oil Company of California

'Pancho' Barnes

(Continued from page 37)

into what seemed a clear field. She hooked the landing gear on a moving truck and rolled the plane up in a ball. She was unhurt, but the accident cost her the race.

During her racing days Pancho was a leading spirit in the birth of the short-snorters, and she insists that, no matter what anyone else says, this is the way it happened:

"We were there and broke, of course. A bunch of us were standing around—Frank Clarke, Frank Hawks, Ray Minor, Les Gillis, Chubby Gordon and some more.

"Being broke, we had an idea. We would pick some likely-looking candidate—maybe a young pilot who had just flown a good race and thought he was hot. We would tell him that a very exclusive club was being organized and that his name had been proposed.

"We'd tell him that a dollar bill, which we would sign, would be his membership card, and there would be an initiation fee. We fixed the fee at what we thought we could get.

"Once we had his money, we'd tell him: 'Listen, sucker, that's all there is. Now you go out and try it yourself.'"

How the Short-Snorters got to be what they are today, Pancho doesn't know, but she'll swear on a stack of logbooks that this was the beginning.

At one time she held the women's speed record, 196 m.p.h., in the famed *Travelair Mystery Ship* built by Walter Beech. In this same ship she beat Roscoe Turner by 20 minutes in a flight from San Francisco to Los Angeles. Turner was flying photos of the annual "big game" at Palo Alto for the Los Angeles *Examiner* while Pancho had the same assignment for the rival paper, the Los Angeles *Times*. Since there was no baggage compartment in the *Mystery Ship*, Pancho flew the 1 hr. 34 min. hop with the negatives carefully tucked under her arm.

While flying to an air show at Tonopah, Nev., in the same airplane, she broke a fuel line and landed on a dry lake in Death Valley out of gas. A passing motorist took her on to Tonopah and she flew back with Carl Lennish, now a big wheel in the CAA, to fly her plane off the lake. Lennish landed in a severe cross wind and ground-looped, coming to a stop upside down. No one was hurt and Pancho flew the *Mystery Ship* back to Los Angeles. When she returned the following weekend with a crew to bring back Lennish's wrecked airplane, she buzzed the dry lake to signal the location to the truck driver. A nearby bootlegger thought she was a revenuer because of her fast airplane, and broke open untold kegs of home-made rum.

Pancho was the fourth test pilot hired by Lockheed. She flew the maximum load tests on the Lockheed *Vega* and, prior to the first flight with a full overload, engineers beefed-up the shock-cord landing gear. After adding additional shock cord, mechanics painted the jumbo-sized streamlined fairings and then put them into a bake-oven to dry the paint. Of course, the rubber rotted and when Pancho greased the over-loaded *Vega* onto the runway at Burbank on her first landing, both shock absorbers broke at the same time. Had only one broken, she would undoubtedly have gone through a fence, but the *Vega* stayed on the runway and rolled to a stop within the boundary of the field.

Life has never been dull for Pancho Barnes. At 16 she married a clergyman. At 17 she had a son. At 18—in 1927—she left the youngster with a governess, and signed on a banana freighter for a trip down to Central America. The captain was willing to accept men as deckhands or what not, but he balked at signing on a woman. Fifty dollars changed his mind. Pancho joined the crew.

The captain fooled Pancho and several friends who joined the escapade by really making them work. Pancho became a quartermaster, working six hours on, six hours off.

Going ashore in small Mexican ports was a little risky for a woman—a revolution was going on at the time—so they decided Pancho had better be a boy. Solemnly, they cut her hair—"a very poor job," she remembers—and christened her Jake.

San Blas was under siege by a revolutionary army. Outside the town, Pancho and her gang encountered what they thought was the home guard and made friends. They discovered it was the enemy. Shortly, they were old pals with both sides. They would have lunch with the besieging forces, go back to town and dine with the besieged.

But Pancho always had wanted to see Yucatan, ever since, at an exclusive and dignified girls' school she had seen pictures of Chichen Itza.

So she and a crew member quit the banana freighter and started hiking across Mexico.

He was riding a very tall, bony white horse and was carrying a long stick like a spear. She was riding a mule.

"You look like Don Quixote," she told him.

"And you look like Pancho or Sancho or whatever the other guy's name was," he told her. So she became Pancho, and the name stuck.

They wandered through Mexico and Yucatan, she worked her way back on another freighter—still as a boy—and hitch-hiked and rode freight trains to her doorstep in San Marino.

On her return from south of the border, she started flying—and frequently flew her clergyman-husband to church conventions. As a minister's wife, she was active in the usual social work and was able, with studied concentration, to separate her salty, Mexican-masquerading vocabulary from the polite drawing-room conversation of the social circle.

In the Era of Wonderful Nonsense, Pancho's big house in San Marino became a sort of unofficial aviation center for business and whoopee. There were marvelous parties, enthusiastically attended by the famous folk of aviation, movies and the art world. These parties could last a week or two. Pancho might go away for a few days, come back, and find the party still going.

The wall of the little barroom was scribbled with famous names. Ernst Udet drew cartoons there. Henry Clive's voluptuous siren, done with lipstick and eyebrow pencil, adorned the wall over

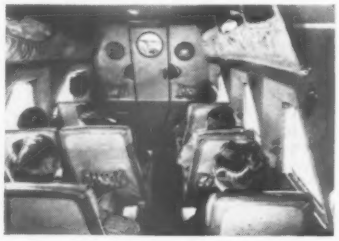
15 YEARS AGO

FROM the March, 1934, issue of this magazine:

Professor Auguste Piccard, in a talk before the Institute of the Aeronautical Sciences, estimated that the maximum speed for a plane flying at an altitude of 10 miles would be approximately 448 m.p.h. He added, "However, such a plane would require special aerodynamic features . . ."

A Curtiss-Wright Condor was the first airliner to be equipped with sleeping facilities. Two berths, an upper and lower, were used for the first time by passengers Capt. Eddie Rickenbacker and Alexander Strong, a Boston engineer.

The Stinson Model A tri-motored airliner which was "really an innovation in commercial flying," went into production. The Model A, designed to carry "eight large people" (see photo), was powered by three Lycoming 240-h.p. engines and cruised at 150 m.p.h.



More war stories were wanted by readers and the editor commented: ". . . we will have to drop the true stories and take up fiction unless we have some military action in the near future."

Sign of the times. The following advertisement appeared in the classified section: "Young man, 20, will go anywhere, at any time, to do work of any kind, in exchange for a used airplane in good flying condition, and two or three dollars a week salary to live on. . ."

TWENTY YEARS AGO

Willis Ray Gregg of the United States Weather Bureau said: "Weather service for aeronautics is in the pioneer stage. We are trying out different schemes. We hope and believe some of them are along the right lines . . ."

NO. 34 IN THE SERIES FEATURING PROMINENT ESSO AIRPORT OPERATORS

"A CLEAN ENGINE HELPS A LIGHT PLANE DELIVER MUCH FINER PERFORMANCE. THAT'S WHY I TELL MY FLYING STUDENTS AND LIGHT PLANE BUYERS TO USE ESSO AVIATION OIL HD. IT HELPS CLEAN THE ENGINE IT LUBRICATES."
P. Brock Minor, Esso Airport Operator, President of Cavalier Aviation, Inc., and Dealer for Ercoupe, Bonanza Aircraft. Richmond, Va.
"WHEN FLYING MY BONANZA FOR PLEASURE OR CONTACTING WIDESPREAD LUMBER INTERESTS ON BUSINESS, I'VE ALWAYS FOUND ESSO AVIATION FUELS AND LUBRICANTS COMPLETELY DEPENDABLE."
E. A. Powell, Vice President of David M. Lea Co., Richmond, Va.

IN AMERICA'S LARGEST AND MOST MODERN aviation petroleum laboratories constant research by a staff of over 2000 scientists and technicians maintains the famous *high quality* of Esso Aviation Products.

YOU CAN DEPEND ON

the bar. Cliff McBride caricatured a prohibitionist.

There was plenty of entertainment. Lawrence Tibbett sang, Ramon Navarro led the crowd singing pilots' ditties, Eric von Stroheim hypnotized Dick Grace. Hair-raising yarns, with gestures, were told by Jimmy Doolittle, Frank Clarke, Frank Hawks, Roscoe Turner, Wiley Post and many others. Amelia Earhart helped to organize the women pilots; the Women's Air Reserve and the Aviation Mechanics Union were formed there.

Came the depression and Pancho went broke. In 1934 she was "awful broke" with only a single dilapidated apartment house to her name. She traded it for 360 acres of desert land and a small ranch house on the edge of Rosamond Dry Lake, 60 miles northeast of Los Angeles. The place was an isolated ex-bootleg joint, complete with a still, but Pancho called it home.

She shot jackrabbits, raised cows and ran a dairy (which supplied milk to the Muroc Air Base for 12 years) to pay her bills. Surprisingly, she liked the serenity of the desert and she's been there ever since.

Today Pancho's is a flying dude ranch with a 4,000 member guest list limited to pilots. The ranch has a good sod airport, lighted at night, and Pancho is official meeter and greeter. Officially the resort is called the "Rancho Oro Verde" but guest cards include, in small print, the "Happy Bottom Riding Club."

"If you don't belong to Pancho's club, who in hell are you anyhow?" ask the flying old timers of the Southland. Number one member is Jimmy Doolittle who is a frequent visitor when he is in California.

When a stranger lands at Pancho's for the first time, he fills out a club membership. In addition to license numbers and pilot ratings, the questionnaire asks if the applicant is congenial, easy to get along with when imbibing and tolerant of other carefree guests.

Much of the business at Pancho's cafe, motel and bar comes from the nearby Muroc Air Force experimental base. The ranch is just outside the traffic pattern for the huge desert testing laboratory—and high on the list of the famous in Pancho's guest book is Capt. Chuck Yeager, first pilot to crack the speed of sound in the X-1. Pancho takes credit for pointing out 25-year-old Yeager to General Doolittle long before the first speed attempts.

To add to the popularity of Pancho's is a swimming pool, a herd of nearly 60 horses and a half dozen attractive hostesses who act as waitresses, dance with guests and generally maintain a care-free atmosphere consistent with this isolated resort.

Stories, long ago turned into legends, usually come from Pancho's lack of feminine demureness or her beautifully fluid vocabulary. During a visit to Washington, D.C., to confer with Department of Commerce officials, Pancho was the guest of Phoebe Omlie, special assistant in aeronautics. Before the confab began, Miss Omlie gave Pancho a long and complete list of words she was not to use before the officials. To break the ice at the meeting, Pancho passed the list around among the law-makers. After that, everyone got along fine.

She smokes cigars. Someone once gave her a cigar, and just to make the guy happy, she smoked it. The story got around, and everywhere Pancho went a cigar was always proffered. After all, it seemed an easy way to make other people happy. Now, however, she rolls her own cigarettes because, she says, it takes her so long to make them that she doesn't smoke too much.

During prohibition she drank, mainly because she felt that the 18th amendment was a restriction of fundamental liberties. Even with a bar at her flying dude ranch, she seldom touches a drop today.

She's a writer too. For six years between flights she was an author for the top-flight movie director, Eric von Stroheim. She has had a couple of short stories published in national magazines but when the editor of one of the largest weeklies in the country challenged the accuracy of her flying background in a piece of fiction, she tore up the story and hasn't written a line of copy since.

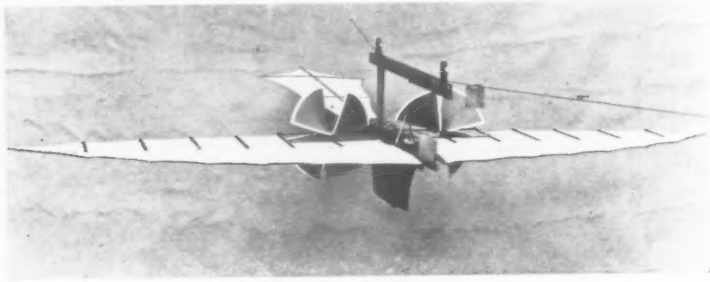
Just before the ban on commercial recordings Pancho hired an orchestra and made transcriptions of eight songs. She's written 28 musical numbers but can't play any musical instrument. Top favorite on her juke box is a Sophie Tucker-ish piece called "I Want To Go Home With You."

There are two sure ways to make a hit with Pancho. Ask her either about her operation or her horses. Recently she had a "sympthectomy" for her high blood pressure and she takes great delight in sliding her shirt up around her shoulders and showing visitors the neat surgery down both sides of her back.

With a background of rodeo riding, horse shows and western movies mingled in with her flying, it is only natural for Pancho to devote a large part of her time to four-footed horsepower. Her current favorite is a "quarter horse" named "Trigger Boy." She and her son drove a truck all the way to Indiahoma, Okla., to buy "Trigger Boy" and another headline horse named "Geisha Girl."

To compete with the airport at Pancho's, visitors now find busy corrals, a running track and rodeo grounds.

The granddaughter of the Union Army's balloonist is carrying on the idea that someday everyone will fly. Her contribution is giving pilots a pleasurable destination when they're out flying. END



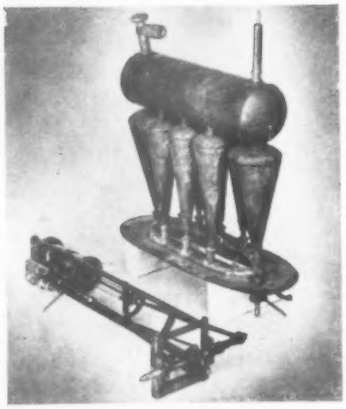
FIRST POWER-DRIVEN MODEL

FIFTY-FIVE years before the Wright Brothers' flight, an obscure English inventor named John Stringfellow built the world's first power-driven model plane (above). Powered by a tiny steam engine, the craft flew 66 feet in 1848—the first time an aircraft was able to sustain itself in flight by means of its own powerplant.

The model had a 10-foot wingspan, and a two-foot chord. It weighed about eight pounds, had two props. The engine (shown at right) was compact and extremely powerful for its size.

Amazingly, the model was similar to present-day craft: It had a tapered monoplane wing, and twin pusher propellers, both of which are used on modern planes.

Much of Stringfellow's apparatus is now on view at the Science Museum, London, which holds the British Crown copyright on the accompanying photos.



When the inventor died, in 1883, he was unaware that his steam model would later be considered one of man's notable steps in the fight to fly.

Island Hoppers

(*Continued from page 28*)

employees (more per plane than mainland airlines) do a top-notch job of maintenance. Planes are often landed and sent aloft again within five minutes. A report from a plane in flight is received by its seven radio stations every 2.6 minutes of the day.

Its pretty stewardesses are part-Hawaiian, and have such exotic names as Kepeleokalani, Pau, Kaanu and Kamai. They know the routes as well as the pilots and frequently point out to tourists where Hawaiian ancestors hunted in the king's service or went ti leaf sliding down the slopes of Haleakala Crater.

Hawaiian Airlines' only competitor for the passenger trade is Trans-Pacific Airlines, a charter route owned by a wealthy "hui" (Hawaiian for association) of Honolulu businessmen of Chinese ancestry. TPA, which flies five DC-3s. was started two years ago by Ruddy Tongg, a young Honolulu publisher, real estate operator and financier. TPA does a land-office business flying charter groups.

Its specialty is fishing parties and athletic teams. Hawaii depends almost entirely on island teams for its sports so TPA keeps its planes in the air most of the time flying baseball, basketball and football teams from one island to the next. Dozens of fishing parties charter TPA planes for weekend and overnight trips to the fishing grounds on the outlying islands. The long surf casting poles are strapped down the center aisle of the passenger planes and the catch, on the return flight, is heaped on canvas stretched between seats.

TPA also charters its planes to dozens of Hawaiian bands and hula troupes. Its hostesses are accustomed to a hip-weaving hula down the aisle as a troupe puts the last bit of polish on a new dance routine. Hawaii's only circus, which junkets throughout the year from one island to the next, sends its performers by TPA while the elephants, tents and equipment go by slow ocean freight.

The most startling aspect of island flying is the tremendous freight business developed by Hawaiian Airlines and Trans-Air Hawaii, Ltd., a charter line started two years ago by veterans.

Together the freight planes of these two airlines fly more than 2,000,000 pounds a month.

Air freight is fast and relatively cheap. A sewing machine, ordered by mail on Monday, is flown to Hilo from Honolulu and delivered to the door on Wednesday for $1.35. The simplicity of air freight packaging appeals to island shippers who otherwise would have to crate merchandise heavily to withstand rough dockside handling.

If it's not too large for the doors, it usually flies. A 1,600 pound Brahman bull flies regularly from his home on the island of Kauai to service herds on outlying islands. He left Kauai one recent Saturday afternoon, flew 192 miles to the island of Molokai and was rushed back to his herd Monday morning. Freight planes can be equipped with padded stalls

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Attention: Aviation Cadet Branch,
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FLAT SPINS

POLICE 'COPTER CAUSES TRAFFIC JAM

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AIRPLANE RACES PONIES

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NEIGHBORS SQUAWK AT LOW-DOWN TRICK

• CAUSE FOR ALARM
Austin Yarnell, oil man of Wichita, Kan., wishes airliners weren't so darned comfortable. Bound for an important conference at Oklahoma City, he fell asleep immediately after boarding plane. He awoke, anguished, at Dallas—after snoozing through approach, landing, and take-off at Oklahoma City.

• EFFICIENCY
When Prague police used a helicopter for traffic control at a recent Czechoslovakian festival, they thought they'd hit on a novel air-age method

for directing crowds. But the throngs were so fascinated by the hovering machine that rubber-necking pedestrians and drivers caused a major traffic snarl.

• TWO BITS TO SPARE
When Mrs. Ralph Slusser boarded an airliner in London for a trip to her Los Angeles home, all she had was her plane ticket and 45 cents. But she made it all right—and with two bits to spare. The meals in flight were free and all she spent during a stopover in New York was 20 cents for phone calls.

• LONG DISTANCE
Tom Perry, station manager of Peruvian International Airways at giant Idlewild Airport in New York, can almost yell across to maintenance crews in the hangar opposite the terminal building. But to get to the hangar without crossing busy runways, he must travel the perimeter of the field—a distance of 7½ miles!

• HIGH PRICES
A Burma citizen, U Myint Daw, shelled out $1,092.40 for a flight from Rangoon to England to see London's automobile show and buy a new car. His only purchase was four door handles for his own 1939 model. As he climbed back into a plane for the return trip, Daw explained: "Prices were too high."

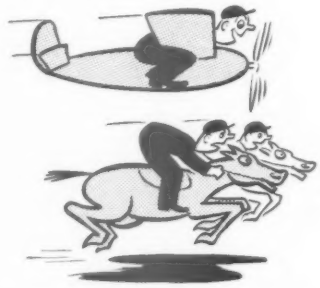
Forty per cent of the passengers using commercial airlines make less than $6,000 a year.

• THE GOOD SHALL BE REWARDED
A Rockville, Conn., pheasant breeder thought planes flying overhead were stunting his birds' growth. He asked local pilot Arnold J. Buck to buzz the coops so the flock's reaction could be studied. Obligingly, Buck made several 100-foot passes. The pheasants weren't frightened, but the neighbors were. Buck was fined $25 for low flying.

The average motorist today has a better grade of fuel for his automobile than Charles Lindbergh had for his famed flight across the Atlantic.

• AMBITION FULFILLED
From the time Maxine Simmer was a little girl she wanted to be a pilot. Today she is not only an active pilot but also an aeronautics teacher in Eau Claire, Wis. This is not too unusual—except that she now is a Benedictine nun.

• FOLLOWED THE HORSES
An Inglewood, Calif., sportsman liked horse races too well. Police arrested him after he swooped low over



the Hollywood Park track, raced the ponies around the course.

—Harold Helfer

within 30 minutes notice and eight race horses can be loaded aboard for the next day's horse race 200 miles away. Wild mountain goats, captured in the mountains, are trussed and loaded into planes and flown to Honolulu for special Filipino feasts. Freight handlers learned a long time ago how to squeeze exactly 40 squealing pigs into the freight compartment of a DC-3. They also learned that it takes a special crew of cleaners to scrub out and disinfect the compartment before the plane is allowed to go back into service again. Freight planes have special metal compartments for hauling fish from the outside islands to the big fish markets in Honolulu. Giant sailfish caught off the Kona coast of Hawaii are in River Street markets within 24 hours.

Trans-Air Hawaii has pioneered heavy freight hauling. Each day one of its three C-46s flies into Honolulu with 6,000 pounds of fresh milk from dairies on Maui, 106 miles to the southeast. Two air-scoops force a 170-mile-an-hour stream of air over 200 pounds of dry ice to keep the milk at exactly 41°.

The airline is increasing the tonnage of fish flown in from the fishing grounds on French Frigate Shoals, 450 miles northwest of Honolulu. Hawaii consumes a tremendous amount of fish and fishing boats operating directly offshore cannot supply the demand. To get more fish, a group of local fishermen in 1946 flew to Tern Island on French Frigate to establish a fishing camp. Trans-Air makes the three-hour flight up to the island about once a week with food and supplies for the camp and comes back next day loaded with lobster, turtle and choice table fish.

"The airplane," says Trans-Pacific's Ruddy Tongg, "has given Hawaii a whole new concept of time and distance. A few years ago a business trip from Honolulu to Hilo meant two overnight boat trips. Now businessmen fly to Hilo in the forenoon and return home in time for dinner. We have changed from a seafaring people to aviation enthusiasts who can tell by the sound of motors overhead whether it is a Navy *Mars*, an inter-island DC-3 or a United DC-6." END

Cheaper Than Driving

(*Continued from page* 44)

tear. The muscular and nervous energy required to fly today's light airplanes is negligible compared with the muscular and nervous energy required to drive modern automobiles over dangerous, crowded highways.

I believe that most businesses and institutions which require much official travel could profit greatly by encouraging their employees to obtain pilot licenses and to fly. The use of rented planes would soon provide convincing evidence that flying is cheaper and better than any other form of transportation. The rental of planes would soon lead to their purchase. In many individual cases, where yearly travel is high, the usual six cents per mile alone would support a personally owned airplane. Let's give the facts a chance to speak for themselves. END

Thunderjet

(Continued from page 22)

day with temperature at 70°. Because there is no torque with jets, the average pilot is at first likely to walk the rudder more than is necessary on the take-off run. Directional stability on the ground is good. The rudder becomes effective at about 70 m.p.h. indicated air speed; up to that point, light pressure on the brake pedals is sufficient for maintaining direction.

Air Force regulations restrict fighter planes from intentional spins and snap maneuvers, but normal recovery procedures are adequate for the *Thunderjet* should the pilot find himself in an accidental spin.

The F-84's Mach number limit is restricted (it falls, however, below Mach 1). In high speed dives it is easy for the airspeed to slip past the red line on the indicator, and jet pilots consequently have to exercise constant caution. At high speeds there is no tendency for the plane to roll.

Jets are naturals for directional stability. In smooth air, it's possible to fly for miles without having to touch the stick.

Here's one test pilot's description of a stall in the F-84:

". . . at 10,000 feet I drop the dive brake and retard throttle to 'Idle-Stop.' When air speed drops to 200 m.p.h., I extend landing gear and flaps (using 40°), then hold the nose up as the speed drops. It's not like a *Cub*—stall angle is slight. At first, there's a tendency to walk the rudder too much. The nose should drop at about 118 m.p.h. There's a brief stall warning which occurs at about 122 to 119 m.p.h."

Another of the five test pilots tells about slow rolls in the fast Republic *Thunderjet:*

"They're executed the same as in a conventional plane. The *Thunderjet's* speed requires very little elevator correction to hold the nose up while the plane is on its back. . . . You must use light, easy stick movement or you'll wind up in a high-speed stall in short order. Your rate of roll is approximately 360° per second with full aileron deflection."

Describing a landing, one of the Republic test pilots says:

"On final approach hold speed to 150 m.p.h. Hold your power at 50 per cent until you are over the edge of the field and ready to flare out. That's done to give you ample opportunity for recovery of power should you have to go around again. When within the airport boundary and in position for flare-out, cut the throttle to 'Idle-Stop.' Pull the nose high as speed drops. Touch down at about 122 m.p.h.

"Remember, the rudder loses effectiveness under 70 m.p.h., so you will have to use brakes in order to obtain directional control . . ."

Gear worn by F-84 pilots includes conventional flight coveralls, parachute, Mae West, bail-out bottle, regulation oxygen mask, and jet helmet. END

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IT'S poor economy for the average lightplane pilot to pay hangar rental when he can build a hangar for less than $200. It took two of us only two days to construct an attractive, simple structure.

Here's how we did it:

First, plot out the position of the hangar on the ground. If possible, place it on a spot slightly higher than surrounding ground to allow for water drainage, and try to put it in the shelter of trees, eliminating the need for anchoring the roof. A dirt floor is adequate.

Second, put the posts—which form the upright support—into position. You can cut your own posts, creosote them and sink them four feet into the ground.

Third, nail 2"x3" boards horizontally around the outside to form a frame. Nail a "Gyplap" siding to the frame. "Gyplap" requires no painting.

Fourth, to support the 40-foot span of roof, construct a beam (combining three 2"x6" boards to run along the front of the roof). Put it together on the ground, then put into position in one piece. It will be necessary to support the center of the span temporarily with a post until the V-truss is placed into position.

Fifth, space 2"x6" boards at intervals to form the main support for the roofing. Across these, place 1"x4" boards, and secure the corrugated roofing to this.

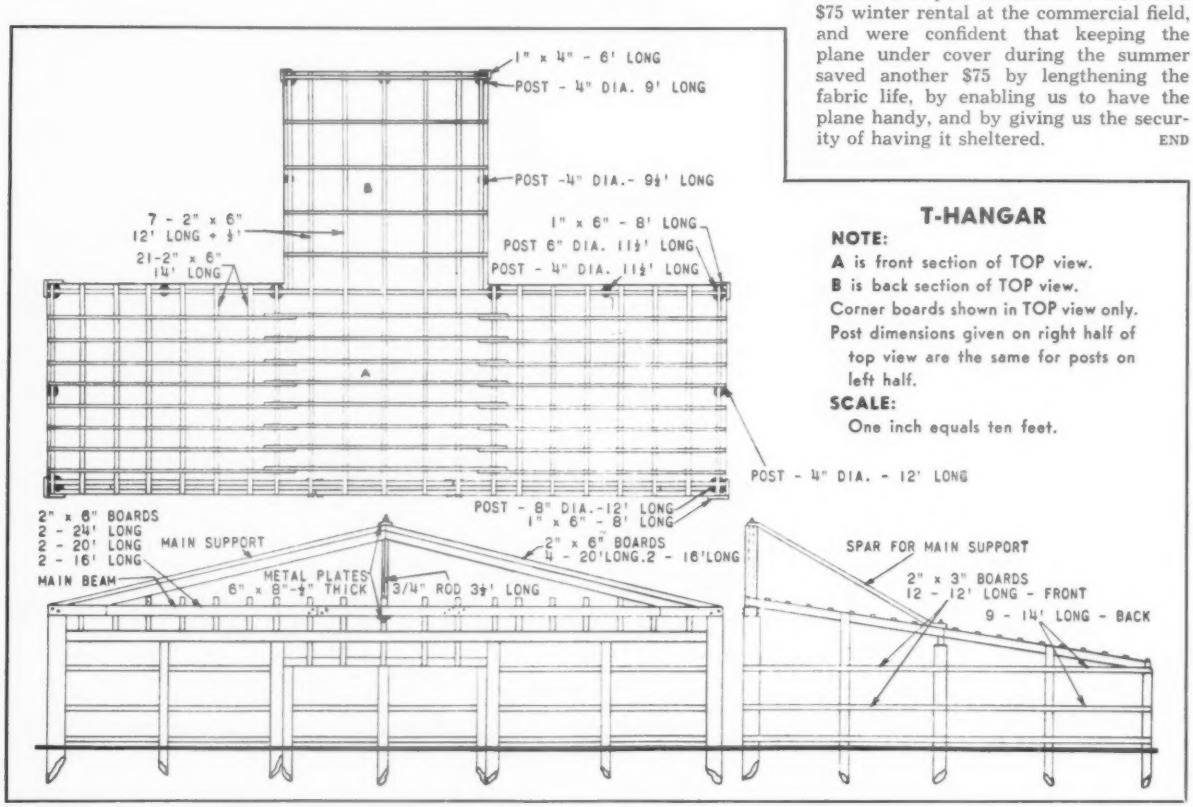
Sixth, place an inverted V-truss over the beam for further support. A metal rod should be secured to the top of the truss, and fastened through the roof and the main beam. The threaded end of the rod should be bolted at the bottom of the beam and taken up enough to make the beam level.

Seventh, paint the external wooden surfaces. You can leave the inside unpainted.

Even without doors, the hangar offers ample shelter from sun and rain. If you plan to build where strong winds prevail it is a good idea to sink the two main posts in cement, bolt the roof to the posts, and even tie the center of the roof to the ground by means of a cable.

The cost of the materials will vary, of course, but these are the approximate amounts required: 800 feet of lumber, 700 feet of siding, 800 feet of roofing, metal plates, rods, nails.

We figured that the hangar paid for itself the first year we had it. We saved a $75 winter rental at the commercial field, and were confident that keeping the plane under cover during the summer saved another $75 by lengthening the fabric life, by enabling us to have the plane handy, and by giving us the security of having it sheltered. END


1" x 4" - 6' LONG
POST - 4" DIA. 9' LONG
POST -4" DIA.- 9½' LONG
7 - 2" x 6" 12' LONG + ½'
21-2" x 6" 14' LONG
1" x 6" - 8' LONG
POST 6" DIA. 11½' LONG
POST - 4" DIA. 11½' LONG
POST - 4" DIA. - 12' LONG
POST - 8" DIA.-12' LONG
1" x 6" - 8' LONG
2" x 6" BOARDS
2 - 24' LONG
2 - 20' LONG
2 - 16' LONG
MAIN SUPPORT
MAIN BEAM
METAL PLATES 6" x 8"-¼" THICK
3/4" ROD 3½' LONG
2" x 6" BOARDS 4 - 20'LONG.2 - 16'LONG
SPAR FOR MAIN SUPPORT
2" x 3" BOARDS 12 - 12' LONG - FRONT
9 - 14' LONG - BACK

T-HANGAR

NOTE:

A is front section of TOP view.

B is back section of TOP view.

Corner boards shown in TOP view only.

Post dimensions given on right half of top view are the same for posts on left half.

SCALE:

One inch equals ten feet.

Inspector

(*Continued from page* 34)

crease back pressure until the plane stalls. Then use normal straight-ahead stall recovery.

One Joe I know demonstrated 720° power turns to me at 500 feet. He started to, anyhow, until I pushed him up to 2,000 feet. I like to see throttle coordination when entering and recovering from power turns. Apply throttle as you lay the ship over into its bank. Anticipate your recovery and take the throttle back off as you roll out of the bank. The maneuver should be completed at the starting point in straight and level flight with the throttle at cruising r.p.m.'s.

One of the few applicants I have had to turn down for his commercial license shouldn't even have held a private ticket. When I asked for a spiral holding constant bank, this is what he gave me: He changed bank steep and shallow downwind and upwind over a spot I hadn't even asked for. This led me to believe Gran'pappy Whipstall had been his instructor back in the good old OX days. That is the way a spiral was done back then, when some maneuvers were really tougher to execute than they are today.

When we reached 500 feet, still sashaying the bank around like a sea gull I took over the throttle control and asked for a forced landing. There was an old country road with no obstructions directly below us, and the wind was blowing straight down this dirt strip. My commercial license applicant never came out of the steep spiral to circle around for a straight approach into the wind, but kept the ship way over in a very steep bank holding over the road. I let him go longer than I normally would, to see what was in his mind. At a dangerously low altitude he skidded all over the country side and nearly wrapped us up into a ball. I took over the ship along with the throttle control, then headed back to the field. This was his explanation, later on the ground, as I filled out his disapproved form:

"Why leave the spot when you're over it?" He intended to spiral down until practically on the ground, then kick it out and land. That may go over big during an air show but don't try it during a flight test. Make the last few hundred feet of your descent in a straight flight path wherever feasible. Get lined up into the wind making your final turn with plenty of safe altitude. Incidentally, the gentleman I just told you about cracked up during a forced landing soon after I turned him down. I wonder if he used his helicopter approach?

Eights around pylons need no special explanation. Six hundred feet is a good altitude for this maneuver. You will probably be asked for the straight leg type, so be sure to practice these along with the two circle eights. The straight leg between pylons gives a good indication of your ability to judge drift. It is required for eights on pylons which are flown at altitudes between 200 and 500 feet. Personally, I prefer eights on, at around 300 to 400 feet, but power setting and distance from the pylon will dictate the pivotal altitude as will wind velocity. Make certain to start eights of all types downwind, between the pylons. Also be sure that a line between the two pylons is at right angles to the wind. Needless to say, never pick a cow, boat or other movable object for one or both of your pylons. It's mighty embarrassing when that cow likes some grass over on the other side of the pasture.

No other maneuvers had more variations than S-turns over a road until recent standardization. One of the most common errors is flying a straight leg instead of rolling directly from one bank into the other. Another is misjudging wind velocity and having to steepen up a bank over 45° in order to get back to the wings level position as the reference road is crossed. Here are a few helpful hints to make your S-turns easier to accomplish. Directly after crossing the starting line upwind make your bank extremely shallow. Make certain you fly sufficiently far upwind to successfully increase your bank and return to the starting line with the wing angle never exceeding 45°. This will come easily with a little practice.

On the downwind side, start your steep bank (not over 45°) as soon as you cross the starting line, then shallow out as necessary. Remember, no straight flying during S-turns over a road. If you keep your inside wingtip at all times a little on the plane side of the starting line, you will be helped in judging the correct bank.

Three 180° spot landings, one with slipping, usually wind up the test ride. Just remember that the inspector is no different than your own flight instructor. He is human and does remember his own private and commercial flight tests. If you will think of these facts you may be more relaxed when your next licensing ride comes up. END

Germany's Lightplanes

(*Continued from page* 32)

passenger from the Orkney Islands to Reykjavik in nine hours.

Innumerable lightplane types were created by industry and individual aviation groups. Emphasis was placed on aerodynamic refinement and stability, as well as flight characteristics. Yet, seldom was any proven type further exploited for economical production. Further developments aimed at and attained maximum speed and range but the designs were seldom perfected to facilitate production and so reduce costs—a problem so well comprehended by the lightplane industry in the United States.

The question of high or low-wing monoplane superiority was decided in favor of the cantilever low-wing monoplane from a standpoint of weight distribution, structural design and crash protection.

The period up to 1933 may be summed

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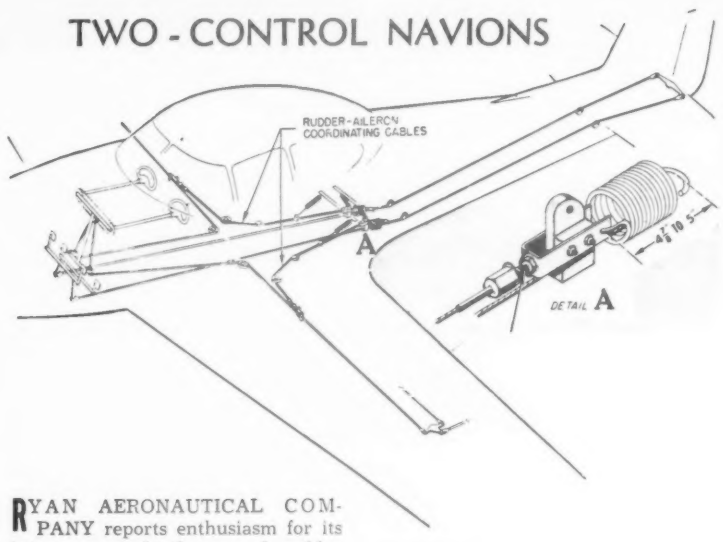
TWO-CONTROL NAVIONS



RYAN AERONAUTICAL COMPANY reports enthusiasm for its inter-connected aileron and rudder control system which gives pilots the choice of flying the *Navion* with the wheel only or with rudder controls if they prefer. In the Ryan system, the rudder pedals become effective by a slight pressure on the spring-loaded inter-connected hook-up. The connection between ailerons and rudder is arranged so that when force is applied to the wheel to move the aileron surfaces for banking the plane, a limited movement of the rudder is automatically accomplished to make a coordinated turn. During normal three-control operation in the *Navion*, use of rudder pedals causes some, but a less pronounced, effect on the plane's ailerons.

up by the explanation that the lack of a reliable low-cost useful engine in the 30-50 h.p. class spurred designers to seek maximum performance by aerodynamic and structural improvements.

The German soaring development should not be passed over. The airplane industry encouraged and helped the soaring movement. Most of the younger lightplane designers started there. They learned their first practical aerodynamics at the controls of a soarplane. Many lightplane customers came from the ranks of glider pilots.

Private flying was severely limited after Hitler came into power. With few exceptions, lightplane owners and their planes were absorbed into semi-military organizations, mostly for service as instructors. Further lightplane development was virtually suspended because designers were crammed with orders for military training planes.

For participation in the international Challenge Rally of Europe in 1934, however, several modern executive- or tourist-type planes were developed in Germany. The most outstanding, technically, among these models was Willy Messerschmitt's Me-108 (*Taifun*. See "The Europa Rundflugs," FLYING, August, 1948, page 29). Although it was a comfortable, luxurious air sedan rather than a lightplane, and its costs were far above the means of the average private pilot, it greatly influenced later lightplane models.

The Me-108 was an all-metal plane of 34 ft. 10 in. span. It cruised 165 m.p.h., yet could fly slower than 40 m.p.h. Slots increased the stalling angle of attack of the outer wing panels by about 50 per cent, thus maintaining lateral stability and controllability far beyond the maximum lift coefficient. The slots opened automatically and gradually before stalling speed was reached. The slots and flaps permitted a steep approach at only 80 to 85 m.p.h. Then after flattening out, the plane lost speed rapidly and floated very little. Thus, though its 240-h.p. Argus engine gave it a top speed of 188 m.p.h., it could land on an amazingly short runway.

A special feature of the Me-108 was that the fuselage frames were cold-drawn from the sheet metal of the skin during the pre-shaping of the respective skin sections. This method saved a number of production operations and thereafter was applied on all Messerschmitt models.

During the war, Messerschmitt maintained his interest in private plane designs. He transferred development of the Me-208 to the French firm SNCAN. The Me-208 was a modernized 108, including such features as tricycle landing gear, and horizontal dual control columns. It was radically redesigned for low-cost production based on experience with large-quantity military plane production.

Meanwhile a few other new planes were developed in the period from 1935 to 1942.

The Siebel 202 (*Hummel*) was one approach to a low-cost lightplane. It was a low-wing cantilever monoplane of plywood construction with a fairly comfortable cabin and two side-by-side seats arranged for dual control. Gross weight was 1,190 pounds, and wing loading was 6.8 lbs./sq. ft. On a *Zuendapp* 50-h.p. engine it cruised at 84 m.p.h. over a range of 292 miles—which was considered adequate for German conditions.

The Gothaer Waggonfabrik manufactured the only twin-engined lightplane—the GO-150. It was also a cantilever low-wing craft of plywood construction and fixed landing gear. Gross weight was 1,710 pounds and wing loading 9.05 lbs./sq. ft. Its two 50-h.p. *Zuendapp* engines gave it a top speed of 128 m.p.h. and cruise of 122 m.p.h. over 496 miles. This comfortable two-seater had good flight properties, even on a single engine. But despite its low price it was never manufactured in quantity.

The pearl among pre-war German lightplanes was the Arado 79. This cantilever low-wing plane had an all-metal monocoque fuselage. The two-spar wings were of wood with tropic-proofed plywood covering. Span was 32 ft. 10 in. Landing gear was mechanically retractable by a simple gear using weight equalization and spring action. A lever travel of 90° lowered or retracted the gear safely and rapidly. A control light on the panel flashed during an emergency if the gear were out but not engaged into the arresting lock. In that case, the operation had to be repeated. The split flaps were also manually operated by a three-position simple mechanical system. The Arado 79 was powered with a four-cylinder Hirth engine of 105 h.p., cruised at 137 m.p.h., and had low take-off and landing speed. Range was over 650 miles.

The Arado Ar-79 had two side-by-side seats arranged for dual controls, a spacious baggage compartment accessible during flight, and other luxury features. It was certificated for unrestricted acrobatics with a permissible diving speed of 261 m.p.h. In July, 1938, the Ar-79 won two internationally recognized speed records. Average speed over a 1,000-kilometer course was 142.4 m.p.h., and over 2,000 kilometers was 141.2 m.p.h. In December, 1938, the plane set an international long distance record for lightplanes by flying 3,919.1 miles non-stop from Bengasi, Libya, to Gaya, India. Specially-developed drop tanks were used en route.

The Buecker 181 was a competition model of the Ar-79, similar in shape and flight characteristics. It was all wood, with a fixed landing gear. On 105 h.p. it cruised at 121.2 m.p.h. and had a maximum diving speed of 211 m.p.h. It was used by the German Air Force for training purposes and was in mass production.

The last German lightplane design, and one of the most interesting, was the Fieseler Fi-253 (*Spatz* or *Sparrow*). It was developed and built in 1942 in the middle of the war. Its designer, the old-time stunt pilot Gerhard Fieseler, had the idea of converting his successful Fieseler Fi-156 (*Storch* or *Stork*) into a low-cost lightplane capable of landing and taking off in nearly any kind of terrain. It was a comfortable two-seat high-wing monoplane with a fixed slot running the full length of the wing span. It had an extremely rugged fixed landing gear.

The *Spatz* was designed for one-man operation. Because of its light weight it could be pushed without power by one man on any meadow. Wings were folding with a minimum of effort, and the cabin doors remained locked if the wing fittings were not properly secured. The ignition switch was located outside of the cockpit at the engine cowling. It could not be operated unless the emergency hand brake was secure. Landing flaps were variable from 0° to 30°. Like the Ar-79, the Me-108, and others, the *Spatz* had a draft-proof bad-weather window.

Unusual for a high-wing monoplane, the *Spatz* had excellent visibility even in a bank. This was achieved by a slight elevation of the canopy above the upper wingnose.

It was powered with a Hirth engine of 105 h.p., had a top speed of 115 m.p.h., and cruised at 93.1 m.p.h. Sea level climb was nearly 1,000 feet per minute. Landing speed was less than 25 m.p.h., and landing run was only 164 feet. Range was 236 miles. Although the F1-253 never went into quantity production, it would have been an ideal short distance lightplane for farmers, hunters, doctors and businessmen since its landing and take-off abilities would be surpassed only by the helicopter while it had superior flight and performance properties.

German lightplane designers realized that much progress was still possible. In view of the possibilities opened by jet propulsion they did not believe the time had come to standardize on any one type of lightplane. In their opinions, present and especially future lightplanes were in nowise comparable to automobiles.

They aimed first of all, therefore, at high speed and long range, good flight properties and aerodynamic stability for what Americans call "executive-type" planes which operate from regular airfields—in contrast to the short-range all-purpose *Grasshoppers* which can be flown from nearly any medium-level terrain. Foolproofness, so highly emphasized in the United States, was neglected. Designers were not willing to make concessions detrimental to the overall performance of their planes.

Consequently, designers demanded a fairly high standard of training from their pilots. They felt this would be necessary as long as rapid developments continued. Indicative of this trend was the requirement laid down by the DVL (equivalent to the CAA), demanding that each lightplane model had to demonstrate rapid and precise recovery after seven continuous tailspins in each direction in order to receive a certificate of approval. German lightplanes were excellent, and in many cases superior, but they were not conceived or built to satisfy a mass market on the scale of that existing in the United States. END

FLYING
"Aw, go to sleep, Mom. Pop's probably been weathered in somewhere."

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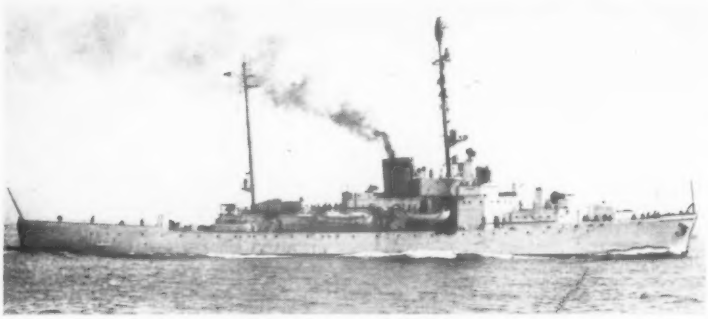

The Spencer, U. S. Coast Guard cutter, provides information for trans-Atlantic planes.

WEATHER SHIPS

A SMALL flotilla of weather ships at more than 10 mid-Atlantic stations serve as signposts and information centers for trans-ocean aircraft. Five countries provide the ships under a UN agreement and costs are shared by Belgium, Canada, Ireland, France, the Netherlands, Norway, Sweden, the United Kingdom, and the United States.

The 327-ft. cutter *Spencer* (above), like its sister ships, broadcasts data on its position 24 hours daily and often talks directly to more than 500 aircraft during a 21-day tour of duty. Detailed weather information is available at any time to any plane.

Radar is used to gather weather information and a team of weather observers constantly checks conditions with radio-equipped balloons. Data is radioed to shore, where it is used for long-range weather forecasts.

In addition to routine activities the ships assist in mid-ocean crashes. When the flying boat *Bermuda Sky Queen* went down recently, the U. S. Coast Guard cutter *Bibb* rescued 69 passengers and crew members.

Radar operator (right) follows plane in distress as crewman (left) plots its course.

I Learned About . . .

(*Continued from page* 48)

from Boston. "What do you think?" I asked. He shook his head, saying he was afraid to try it himself.

But several of the men seemed to feel I wouldn't be taking a chance. Bolstered by their opinions, and disregarding the others, I patted my new commercial glider license and with an "I'm a pilot" feeling decided to take-off anyway.

I climbed in, closed the hatch and tested the controls. Men on either wingtip held the plane down, but I found that if I pulled the stick back the sailplane would lift off in spite of the wingmen. But high wind or no, I made up my mind to fly.

The towcar took up the slack, the wingmen let go, and before the car was well underway I was in the air. It was highly turbulent, so I climbed slowly. But before I reached the middle of the field, I was at the top of the rope.

Then I made my second mistake—the first was when I took the plane out of the hangar—for I released the rope. My plane began to sink at a terrifying rate, and I dove in order to pick up speed and get to the hill brow. I cleared the brow by 50 feet and immediately hit such violent lift that the plane groaned from the load. Rate of climb went "off the end" – and I broke out in perspiration. Half-way toward the end of the ridge, I hit 2,000 feet. I had one thought: How'm I going to get down?

I flew behind the ridge, directly over the edge of the field, and started to circle. After two 360's it seemed I hadn't lost a foot of altitude. A quick glance at the altimeter confirmed this. In fact, I had gained 300 feet and the rate of climb indicator was still off the scale! I dove to 50 m.p.h., then 60 m.p.h. and still the rate of climb was at the end of the scale. And about 100 feet above me was a giant black cloud. I was frightened—no chute, no blind flying instruments! The plane was placarded for 70 m.p.h. but I frantically started to dive. The instrument read 65 . . . 70 . . . then 75 m.p.h., and still the rate of climb showed full scale.

About the time I had decided to try spinning it down, the rate of climb started down. Soon I flew out of the area of great lift, and was able to slow the plane down to normal. I was obsessed with the desire to get back on the ground, and started a violent slip—holding it until I was about 100 feet from the ground.

I breathed a sigh of relief, until almost immediately I discovered that at 45 m.p.h. airspeed my groundspeed was practically nil—and it was really turbulent! I was banging and rattling around in the plane, getting more frightened each minute. I felt like a passenger—with the plane giving *me* the ride. It was jumping all over the place in spite of everything I tried to do. Finally I felt a wheel touch the ground, but only for an instant. The plane shot up 50 feet, and I was certain I couldn't get it back down before I ran out of field. So I started a gentle slip. Immediately the right wing went down. With the stick all the way up in the corner and with full rudder, it wouldn't recover. "We" turned until I was headed directly toward the Administration Building, and only then did we level off. I had too little speed, so waited until I came close to the building, then zoomed to clear it closely and save the speed I had. I missed the building, but failed to see a pole used as an instrument mounting. The right wing smashed into it about two feet from the top, and was sheared completely off just outboard of the strut attachment fittings!

The plane spiralled into a grove of birch trees, and came to an abrupt rest vertically, with one wing on the ground and the fuselage nose directly on a fence post.

I climbed out, jumped down and over the fence before my friends arrived.

Was I hurt? No, except I'd scratched my hand climbing over the fence! The plane's nose was smashed, the elevator damaged, and both wings ripped beyond repair. Why? Because I was cocky and didn't respect the terrific turbulence associated with high winds and gusts. The lesson I learned is essential for glider pilots, even more necessary for lightplane pilots. Sailplanes and gliders often fly when lightplanes are grounded—because the pilots have studied wind effects and wish to take advantage of them.

But I lacked a basic knowledge of my limitations. This experience left me sadder, poorer and thankful — but much wiser. END

Paper Air Force

(*Continued from page 20*)

twice that of the Organized Naval Air Reserve's authorized total) is still some 11,000 short of being filled.

That's far from the whole story, however. The Reserves need more than manpower. They need reorganization. Biggest difficulty lies in decentralization of command. With commands spread throughout the country, it is impossible to maintain unified operating efficiency. And much of the present decentralization could be eliminated.

For example, the Air National Guard and the Air Force Reserve could be amalgamated. The suggestion is not new. It was advanced by the National Defense Department's committee investigating civilian components of our armed forces. It was proposed by the Congressional Air Policy Committee. It was suggested by numerous private military-minded groups. But nothing has been done about it.

The Air National Guard, organized under the National Guard Bureau, is primarily a state, not a national, organization. National headquarters can make recommendations, but it cannot force a state unit to do anything a state governor doesn't want. Consequently, the Air Guard has no national standard for pilots. They must get 100 hours of flight time per year —20 of them instrument and 15 at night. These are three of the few requirements necessary for Federal recognition. Other than these, flight operations vary from state to state.

Even so, the Air National Guard is more effective than the Air Force Reserve. The AF Reserve lacked funds until last July. The Air Force, floundering in its fight for autonomous status, devoted little time to gain funds or direct attention to its reserve component. Nothing but training planes (AT-6s and C-45s) were provided for reserve pilot training. They didn't pay squadron members for drill periods. And they had insufficient funds for more than a handful of AF reservists to take annual two-week training duty. The outcome: the Air Force Reserve is little more than a paper outfit.

Recommendations for the consolidation of AF Reserve and Air National Guard have asked that the amalgamated organization be placed strictly on a national level. It could be broken down into organized and volunteer sections like the Navy Reserve. One big object would be to keep the criteria for personnel from being primarily the ability to stay on friendly terms with the squadron commander—generally a political appointee in the Guard setup.

Even if consolidation is not accomplished, however, the situation is far from hopeless. For greater efficiency, the Air Force Reserve and Air National Guard could revise their internal functions. Pilots have a difficult time logging their required 100 hours per year. They do no flying during regular drill periods. That is the result of a high echelon decision to meet once a week for only two hours—at night. Two hours is established by law as the minimum time a Guardsman or Reservist must attend to be paid for a drill. The Navy started out with this same policy but changed (to one weekend, two days, or 16 hours per month) when it became evident that two hours scarcely allowed ground personnel time to change into and out of their overalls, much less for pilots to get into the air for actual training.

Naturally the Guard or Air Force Reserve pilot must fly on weekends or other days off to log the 100 hours. Pilots often can't fly as a unit, and inevitably individual hops are numerous in logbooks. The fallacy of such operations is obvious: military aviation is strictly a teamwork, not an individual, operation.

Unlike the Navy, there is no standard curriculum for ground training of the Guard and AF Reserve. Neither flight nor written tests are given to cover general basic achievements.

Is this bad? Consider the situation which the Naval Air Reserve (Organized) encountered in June, 1948:

During fiscal 1948, the ground school syllabus called for the Naval Reserve pilot to spend 132 hours in classroom training. That put ground training on a par with flight training (which was proved profitable during the war). But the Navy didn't adhere to the schedule. The average pilot got less than half the required number of hours of ground training. The schedule at individual stations was not flexible enough to expand ground training time during bad weather and retract it during good weather.

And here's what happened. Headquarters at the Naval Air Reserve at Glenview, Ill., distributed a test for pilots to all stations under its command. One of the men who helped prepare the exam (Lieut. Comdr. Andy Anderson of the Reserve Aviation Training Office in the Navy Department) said it consisted of

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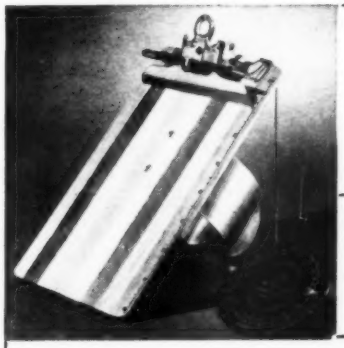

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the easier questions in an exam on which novice regular Navy pilots had averaged 3.5 of a possible 4.0. The Reserve pilots fell far short of that standard. At more than one Naval Air Reserve base, 50 per cent of the pilots flunked the test. For the paper records. Naval Air Reserve commanders are now regrading the tests upward, so it will not look as bad as it is. And Guard and AF Reserve pilots have even less strenuous ground training than do Navy pilots!

Records of the reserves, however, show that actual flying proficiency should be up to wartime standards. Each hour in the air is logged and double-checked—so it seems unlikely that reports on the amount of flight time are erroneous. But there is no check on how the time in the air is spent. The Guard and AF Reserve have no specific syllabus. The Navy does have one for its Organized pilots, and where practical the syllabus has been the rule. Reserve commanders have been known, however, to condone and encourage pilots to log time according to what they needed to fill the syllabus requirements rather than to report what was actually performed on the flight.

Is this bad, you may ask again? Consider the 10 pilots who couldn't hit a sleeve target. The records showed they had enough practice. If the United States were attacked, the records would indicate these fighter pilots had enough gunnery hops to be proficient in shooting.

Or, consider the possibility that a pilot with a record of six or eight hours of instruments gets caught in instrument weather while on a cross-country. If he did not actually fly those instrument hours, he may not get down safely. If the record had shown he was without instrument time, the operations officer or aerologist probably would not ask that he fly in marginal weather conditions.

It is evident that some air reserve components exert greater effort trying to look good on paper than they do to actually become efficient fighting organizations. A good example of this occurred recently at a U.S. air reserve station. An inspecting party from higher echelon came into the station and found that personnel records were not filed in what they considered the best way. At the next month's drill, 50 per cent of the pilots were pulled off flights and ground school and were put to work sorting personnel records. Work which would have been considered tedious for the lowest Government clerk kept the pilots from their assigned training. Getting records into a new arrangement (which had little to do with the unit's efficiency) was more important in the mind of the commander than carrying out his assigned training mission.

It is possible to look good as well as to *be* good. Looks will take care of themselves if a unit is efficient. But our air reserves, apparently, are trying to put the cart before the horse.

One fact apt to be overlooked, however, is that the reserves have been hampered by lack of money. Until last July, the AF Reserve, with a potential of 1,000,000 personnel, operated on an $18,000,000 annual budget while the Guard and Naval Reserve had over $100,000,000 per year. And while the AF Reserve lacked funds, Naval Air Reserve has let some of its funds go unused—and has ended the past two years with surplus funds. The reason: Chief of the Bureau of Aeronautics will not assume responsibility for transferring funds from one account to another! Thus, when the end of the year approaches, and it is evident that the maintenance allocation will be expended by July 1, while the operating allocation will be padded at that time, no effort is made to transfer funds and allow continued normal operation until the year's closing days.

Reserve units are also handicapped by lack of sufficient equipment. The Air National Guard doesn't have enough radar equipment to support the Air Defense Warning System, for which it is responsible. The Naval Air Reserve (Organized) also lacks essential radar. Many Guard and Reserve bases are short of planes necessary to provide training. The reason for this: budget of the reserve components, which is sent to Congress for approval, is geared to the maximum which Reserve and Guard leaders know they can get from the people's representatives. The budget, unfortunately, does not allow sufficient planes. Citizens can only blame themselves for this deficiency. By ingenious means of trading planes with other squadrons, the pilots are logging their required time. But nearly all the planes are wartime models. Only now is the Air National Guard getting a few jets. The Navy doesn't anticipate giving its Reserve jets before 1950. The Air Force Reserve, aside from having 10 A-26s, is using only advanced and primary trainers.

It seems highly probable that the switch of Lieut. Gen. Elwood R. (Pete) Quesada to head the U. S. Air Force Reserves will mean a thorough shaking-up of the reserve system. If the civilian components are given long enough to prepare, the reserves can become sturdy units.

They are not efficient units today. The reserves, the regular military officers, and the public must cooperate to bring the civilian components to fighting trim. Today we have a fighting force on paper. We need a fighting force in the air. END

BIG CATCH

A. G. TALBERT of Lyons, Ill., is an optimist.

Six months ago he bought a Grumman *Widgeon* sight unseen. That's not all. The *Widgeon* was under water—220 feet under—on the muddy bottom of a Minnesota lake.

In August, 1947, the *Widgeon's* original owner had engine trouble over the lake-studded region. Adding to his troubles, the landing gear jammed and the wheels couldn't be retracted—so he made a water landing, wheels down. The *Widgeon* nosed over and sank immediately. The pilot scrambled to safety.

For eight months the plane lay on the bottom of the lake until Talbert, president of a construction firm, heard about it. He decided the *Widgeon* was his dish.

Then the salvage job started. He dragged the lake with a life raft and grappling hook. After two weeks, he found the plane. He then fastened a winch to the 10-man rubber raft, lifted the plane off the bottom, and worked laboriously toward the shore. Each time the plane hit the rising bottom, he tightened the winch. After three arduous days, he was able to lift the plane out with block and tackle on a 50-foot pole.

The whole job took a month.

That was the beginning. Since the lake is inaccessible except by plane, all parts and equipment were flown in. When the two-ton *Widgeon* left, it flew out—on its own power.

Last word from Minnesota was encouraging.

"The big catch still requires a month's work, upholstering and painting.

"But it's now at the South Saint Paul airport."

Could You Fly?

(*Continued from page 27*)

particular questions. Actually, there are no "wrong" answers and no "right" answers. The questions are designed to give an aptitude picture, not to measure your knowledge. No single question is important in itself; it is the cumulative score that counts.

A low score on this test does not mean you cannot be a pilot. Even the extensive aptitude examinations used by the large industries and armed forces are not infallible. The answer you get here, however, is indicative of your natural aptitude for becoming a pilot.

In answering the questions no doubt you noted numerous references to your driving capabilities, athletic skills and mechanical inclinations. Questions on these subjects are more numerous because research analysts have learned that coordination and mechanical aptitude are excellent indicators of aptitude for flying. Also important are physical condition, balance, reaction time, absent mindedness (the lack of it), ability to learn, attention to detail, etc., plus the desire to fly. The exact reasoning behind each question may not be immediately plain, but all the questions are designed to give an indication of one or more of the basic qualities listed above.

Not every question aptly applies to all people. For instance, not everyone drives a car, hence the questions pertaining to driving are inapplicable to him. However, people who do drive and do it well have that fact as an indication of ability to fly since many qualities of a good driver are essential to a good pilot. So it is with the other skills mentioned. The more "can you do" questions which you have answered affirmatively, the more certain you can be that you have the natural ability to fly. The fact that you don't do some of the activities in question, such as driving or dancing, of course does not mean you don't have the qualities they demonstrate.

Feeling apprehensive upon looking down from high places has no bearing on whether you can fly either. In fact, there is a feeling of security in a flying airplane that surprises many people. A feeling of uneasiness upon looking down from tall buildings or cliffs is common to everyone, including experienced pilots. The fear that planes are too frail is also dissipated upon taking to the air. The common lightplane is far stronger in proportion to its weight than your automobile.

Could you fly a plane? Check your score and see. END

ANSWERS TO QUIZ ON PAGE 27

1. Yes	15. Yes	29. No	43. Yes
2. No	16. Yes	30. Either	44. No
3. Yes	17. Yes	31. Yes	45. Yes
4. Yes	18. No	32. No	46. Either
5. Yes	19. Yes	33. Yes	47. Yes
6. No	20. No	34. Yes	48. Yes
7. No	21. No	35. No	49. Either
8. Yes	22. Yes	36. No	50. Yes
9. No	23. No	37. Yes	51. Yes
10. No	24. No	38. No	52. Yes
11. Yes	25. Yes	39. Yes	53. No
12. No	26. No	40. No	54. Either
13. Yes	27. Either	41. Yes	55. No
14. Yes	28. Yes	42. Yes	

To compute your score, add the number of correct answers and multiply by two.

90 or above — Excellent	If you're not already a pilot, you should be.
80 to 90. Very Good	There is little doubt that you can become an expert pilot.
70 to 80..... Good	Your inherent aptitude for learning to fly is adequate.
60 to 70..... Fair	With proper training you can probably master a modern lightplane without too much difficulty.
Below 60 — Questionable	Most persons who score below 60 do not have natural aptitude for flying. Such tests as this are not conclusive, however, especially if the "Do you do" questions do not apply fairly to the person taking the test.

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Stalin's Airlines

(*Continued from page 19*)

but on some of the shorter runs the fare averages $8\frac{1}{2}$ cents per mile.

One of the many peculiarities not generally understood about the Soviet civil airlines is that there is more than the one line, *Aeroflot*. In fact, there are said to be over several hundred airlines in the entire Soviet Union, not to mention the Soviet-run, and in many cases almost wholly owned, lines in Russian satellite countries. *Aeroflot* is the largest line and is administered by the Chief Administration for the Civil Air Fleet (GUGVF), a government-owned and operated trust under the direction of Air Marshal Fedor Astakhov. He is directly responsible to the Council of Ministers of the USSR, which controls all civil aviation and civil airlines except the Chief Administration of the Northern Sea Route (GUSMP). GUSMP is an entirely independent organization which runs one of the largest airlines in the Soviet Union. This line makes bi-monthly (10-day round trip) schedules between Moscow and Providence Bay via Archangel, Andema, Taimyr, and Anardy. The route is of great strategic and international significance for it rings the entire northern boundary of the Soviet Union right to Bering Straits, a line of nearly 5,000 miles.

Many of the Soviet republics and oblasts have their own airlines operating within and out of their respective states. For instance, in the Ukraine there are said to be over 100 separate airline services linking 350 district centers. By official count in 1947 the USSR admitted to having over 80 domestic lines and 24 international lines. Of course Moscow is the hub of all Russian airline activities; it maintains regular air traffic with all the capitals of the Soviet Republic and remote sections of the homeland plus regular service to many foreign capitals. There are over 100 departures a day from Moscow on passenger and freight flights.

One should not be led to believe, however, that each of these lines is independently run or owned. Actually most Soviet civil aviation is under the Chief Administration for the Civil Air Fleet, commonly known as *Aeroflot*, which controls over 75 per cent of all the Russian airlines and nearly all the airports, navigation facilities and the many miscellaneous civil air functions. In some respects, especially with regard to regulatory powers, *Aeroflot's* functions might be compared with our CAA and CAB with these special exceptions: its powers are absolute; all aircraft and air facilities in Russia belong only to the state and the basic regulations governing flight over Russia are equally applicable to all airports and aircraft whether civil or military.

There are several Soviet-dominated airlines in the so-called satellite countries. In Poland *LOT* is still the popular nationalized airline, but instead of buying U. S. equipment as before the war, today it flies mostly Russian-built equipment and operates only as the Soviets dictate. A similar situation exists in Hungary where *Masozvlet* flies; only here Russia actually owns a 50 per cent interest in the line. In Rumania and Yugoslavia, *TARS* and *JUSTA* operate. In Czechoslovakia, a similar situation is now being brought about as a result of the Communist domination of the *CSA* officers and policies. Even in China Soviet influence is being exerted and felt. There the Sino-Soviet Aviation Corporation flies from Alma-Ata to Hami, a distance of 1,415 kilometers with three DC-3-type aircraft. Business is brisk, for in 1946 over 100,000 passengers were carried.

Not until October, 1947, did the first scheduled complete transcontinental airline service become available between Moscow and Vladivostok, and even then only two seats were alloted to through passengers. These flights took an average from $3\frac{1}{2}$ to four days and only departed every third day. A type of transcontinental service did exist between Moscow and Khabarovsk. However, Khabarovsk is only several hours flying time from Vladivostok. Nearly all of the civil air flights have been made in C-47s or the Russian equivalent, the IL-2, until very recently. But even with these semi-modern planes flights were extremely slow due to the inability of the Soviets to fly at night. This, of course, was not the fault of the aircraft, but the critical lack of even halfway modern air navigation and radio ground equipment, especially radio range equipment. On some of the main routes efforts are being made to put 24-hour and all-weather flying into effect. It wasn't until May, 1948, that the first regularly scheduled round-the-clock flight was made between Moscow and Vladivostok.

Night flying is still the exception rather than the rule, though, for it was only recently that the Soviets announced with great pride that it was hoped soon to make Leningrad one of the largest airports in the world, operated the year round,

Yakovlev Yak 16 is a new Russian feeder transport which will be used on short-range Soviet airlines. It is a low-wing monoplane seating 14 and powered by two 700-h.p. radial engines. Compared with earlier Soviet transports, and even with U.S. models, the Yak 16 appears to be a competent, well-designed, and beautifully constructed airplane. Note particularly detail of the nacelles.

24 hours daily; then the announcement added that it was planned that the airport would include three airstrips!

But progress is being made and many of the comforts of flying as we know them are available. Many regular *Aeroflot* flights carry standard crews including a hostess who sells tea and rolls. From all reports the crews are competent and courteous and the same thing goes for most of the ground station personnel.

Civil aviation, though very close to the military, still suffers by comparison. Nearly all the civil airports and terminals of the major Russian cities are below standard unless the military planes use the same field. Most of the large commercial airports still have only sod runways or, at best, steel mats for strips and log buildings for administration headquarters. Typical is Omsk, a city of over 250,000 population whose civilian airport has short sod runways, a few small hangars, and a log administration building; only a few thousand feet away is a large military field with long paved runways, taxiways and hardstands designed to accommodate several hundred fighter planes.

The real efforts being devoted to civil aviation lie in the development of equipment capable of carrying an ever-expanding quantity of freight. For it is in this field that Russia is most woefully weak; these facilities she needs most for peace or war. And the cheapest, most effective and best-suited system lies only through the air for the Soviets.

In order to meet the needs of this constantly expanding airline system the Soviets have had to devote a considerable portion of their aircraft industry to producing transport planes and engines. It is estimated that better than 10 per cent of Russia's aviation industry is devoted to the manufacture of transports. Particular emphasis has been placed on the development of new twin- and four-engined aircraft suitable for both military and civil uses. Nearly all of the equipment is designed primarily to carry cargo. Mass production is still underway on the obsolete IL-2 aircraft, which, with the C-47, is still the mainstay of the Russian civil air fleet.

In 1947 the Ilyushin-12 was first put into active service on some of the major airlines. This airplane, an improved version of the DC-3, is equipped with tricycle gear and can carry approximately three tons of freight in addition to its 27 passengers. Another forthcoming new plane is the Schteche-2 a new twin-engined feeder aircraft capable of carrying 10 passengers. It is a high-wing monoplane of conventional gear with two radial air-cooled engines.

But more important is the development of the four-engined transports which Russia is just now getting into service. The first four-engined transport was put on regular service between Moscow and Kharbarovsk only a few months ago. This ship, known as the IL-18, a 66-place plane, is similar in many respects to the British *Avro-Tudor*. It is stated that the IL-18 eventually will be used for all non-stop flights over 800 miles long, and it is scheduled to be the main plane for the Moscow-Vladivostok run.

In addition, two other new four-engined transports are now being tested and may soon be put in operation. These are the TU-70, a 72-passenger ship similar to the B-29, (See "Russia Steals the *Superfort*." FLYING, June 1948) and a new aircraft, as yet undesignated, which was designed by Yakovlev.

It is estimated that Russian production of medium and heavy civil transport-type aircraft now exceeds 100 per month, six times as many as are being produced in the United States. With increasing efficiency and better utilization it is possible that by 1955 the Soviet civil airline system could become the largest freght carrier in the world. That is exactly what Russia intends to be.

It should never be forgotten that all of the vast Russian civil air facilities are under military as well as governmental control, with training, equipment, personnel and procedures either similar to or interchangeable with the military air force. In time of war or national emergency there would be no difference between the two systems, no time loss in combining the two to form one large, formidable air arm. END

Fishing in Oregon

(*Continued from page* 39)

areas are closed to planes. It would be wise to ask the latest local advice before going into the mountains.

The plateau at the eastern base of the Cascades, over which you will do most of your flying, averages 3,000 to 3,500 feet in elevation. The mountain valleys and lakes to the west offer attractions for sightseeing detours. Crater Lake (south of Bend), for example, is a "must" to my way of thinking. You'll never believe that water can be that blue until you see for yourself. It should be easy to find your way on these side trips, since Oregon's highways lie in wide cuts through the forests. Remember, though, to keep plenty of altitude. I know it's a temptation to sneak low for a close look at a lake in some prehistoric volcanic crater, or even a bathing beauty on the shore, but wind currents in the mountains can be tricky. Better set your plane down first, and do your close-up looking later.

Redmond is the gateway to the Sisters district, and the Metolius River fishing grounds. The major airport of the area is Roberts Field, one mile from Redmond. This ex-Army field was taken over as a community enterprise by the town of Redmond (pop. 2,500). Two local flying services and United Air Lines now use the field. There are two 7,000-foot paved runways and the field is equipped with lights. It is the CAA headquarters for eastern Oregon, with communication and weather offices and a radio range station. Covered storage is available in two large ex-Army hangars, and tie-downs on paved parking space are free. Complete service by A&E mechanics is available, and two

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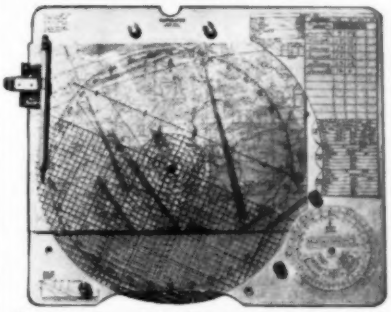

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major oil companies supply the field with both 80 and 91 octane gas. The field, which advertises "349 flying days a year," is managed by Dick Ballentine, Box 591, Redmond.

Mary Conn Brown, AOPA member and co-publisher of the *Redmond Spokesman*, offers the following hints on local conditions: "In summer the air is rough in the afternoons, with wind apt to be gusty, but normally very smooth in the early morning and evening hours. Fall weather here is usually perfect, at least during September and most of October. In the spring there is considerable wind, but hardly ever a day when one can't fly in the morning. Visibility is excellent, as you will note from United Air Lines' record of only 10 cancellations because of Redmond weather, out of 720 scheduled stops in 1947."

Local accommodations may be secured through the airfield. The L-Rancho Motel, which I thought particularly attractive, has rooms for two at $4.50, and lodges for four, with kitchen, at $7.50. The Redmond Chamber of Commerce will supply a complete list of resorts in the area. As an example, the Circle M Ranch on the Metolius River operates as a dude ranch and arranges hunting, fishing and pack trips into the Cascades. The ranch is operated by Cliff and Marjorie Ralston, who will arrange to pick up week-long visitors at the airport. Guests may stay either at the ranch house ($55 per week per person) or in modern cabins ($10 extra). Rates include meals and the use of a horse. Pack trips may be arranged at an extra charge of $10 per day for guide and horse, plus $5 for each pack animal, minimum $25 per day per party. Inquiries should be addressed to Mr. Ralston at Camp Sherman, Ore., as early in the season as possible.

Bend (pop. 10,000) is served by a smaller but satisfactory airport, five and a half miles from town. The field has two bare runways (the longest 4,000 feet) and can supply A&E service and 80 octane gas. As the largest town in the area, and because of its situation on a major north-south highway, Bend offers a wide choice of motels and auto courts, in addition to the best hotel in the district—the Pilot Butte Inn. Rates at the hotel run about $5 for two, in comfortable rooms in a charming rustic building. Auto courts range from very low to high rates, with many in the $3.50 to $4.50 bracket.

The Pine Tavern cuisine leads me to invent excuses to be in Bend at mealtimes. Maybe you'll feel as I do after you've sampled their home-baked cake. Ask for a table in the rear dining room, which overlooks a lawn-bordered pond that meanders through the town. Meals are relatively inexpensive, as they seem to be throughout most of Oregon.

Sportsmen will want to visit the shops of the Evans Fly Company in Bend. This firm sells tackle of its own manufacture, as well as other leading lines of hunting and fishing supplies. Mr. W. Ovid Evans, the manager, told me, "We make reservations for sportsmen from all over the world. They merely have to write, wire or phone us and tell us what they want and we make the reservations without any charges. And if they give us an idea of kind and type of fishing or camping they want we will give advice on where to go and when, as different lakes and streams all have certain times of the year that the fishing is ideal."

Transportation from airfield to resorts or fishing spots is available, as well as expert guide service. This latter will run about $20 per day, and includes everything (auto, boat, special gear) except personal fishing tackle. Mr. Evans advises that reservations at lake resorts should be made early.

Typical rates at Elk Lake Lodge, 34 miles from Bend, in completely equipped, electric lighted four-room modern cabins (two bedrooms, living room with fireplace, kitchen, and bathroom with shower) run $8 per day or $45 per week. Two-room cabins are available at $4 and $5 per day, $20 and $25 per week.

It is both feasible and satisfactory to stay in Bend, however, and travel by hired car to the fishing spots each day.

Other airports in the vicinity include the Madras Municipal Airport, which also utilizes a former Army installation. There are three asphalt runways (longest, 9,000 feet). It offers the essential services but is somewhat more distant from the most popular fishing areas.

A small commercial field at Prineville has 80 octane gas and A&E service.

Maurice Hitchcock Field at Sisters is a private field maintained by Mr. Hitchcock for his personal use. No service is available, but visiting planes are welcome.

There are a number of other emergency and private fields without service facilities which visitors might find useful. Sightseers to the Crater Lake country should know about Beaver Marsh, a CAA Intermediate field (site No. 72) on the Dalles-California Highway near Chemult. Lapine also has a landing strip. In the mountains, there is an emergency field at Santiam Junction, 5.5 miles S. W. of Three Fingered Jack. For those interested in the prairie and antelope country to the southwest, I understand there are emergency strips at Millican, Brothers, Hampton, and Fort Rock; but flyers should inquire at Redmond before attempting to go into that country. The Forest Service also maintains flight strips.

Another famous fishing stream, the McKenzie, lies just over the crest of the Cascades, and some anglers will argue that the McKenzie is even better than the Deschutes. That claim is debatable, but the McKenzie does offer not only rainbow and cutthroat, but from May to July, the spring chinook salmon, which run not uncommonly to 40 pounds.

The McKenzie River drains west into the Willamette Valley, and the fishing resorts can best be reached from Eugene. Willamette Airpark and Eugene Airpark both offer convenient and adequate facilities for those who wish to try their luck along the McKenzie. Best fishing grounds lie 25 to 60 miles east of Eugene on an excellent highway with bus service available. Contact Tom Powers, President of the McKenzie River Guides Association, Blue River, Oregon, for fishing information. The Eugene Chamber of Commerce can supply a list of resorts. Rates range from rooms and cabins at $3 per day, to $15 and $17.50 per day, American plan, at the more expensive resorts.

When planning your trip, keep in mind that although the general season runs from May through October, best fishing varies seasonally from place to place. Local advice, such as Evans Fly Company offers, can be invaluable. You should also get the bulletins prepared for fishermen by the Travel Information Department, Oregon State Highway Commission at Salem. Digests of the game and fishing regulations and a monthly bulletin are available through the Oregon State Game Commission, P. O. Box 4136, Portland. Inquiries regarding the Deschutes National Forest should be addressed to R. W. Crawford, Forest Supervisor, Bend. The Forest Service map indicates minor roads and trails, and will be found most helpful. The Oregon State Board of Aeronautics, W. M. Bartlett, Director, Salem, publishes an excellent chart and airport directory. END

SOME AIRPORTS SERVING OREGON COUNTRY

Airport (longitude and latitude)	Altitude	Phone Number	Nearest Town and Distance	Number of Runways	Length of Longest Runway	Gasoline Grades	Service Facilities	Write to:
Bend Municipal (40°05'-121°12')	3,429	13F3	Bend 5.5 mi.	2	4,000	80	A & E	Ollie Bowman, Box 345, Bend, Oregon
Eugene Airpark (Municipal) (44°02'-123°07')	420	5396W	Eugene 1.6 mi.	1	2,800	73-80-91	A & E	Harry Francis, Mgr. Eugene Airpark, Eugene, Oregon
Mahlon Sweet (Muni. U.A.L. stop) (44°07'-123°13')	362	217 (UAL)	Eugene 8 mi.	3	5,200			
Willamette Airpark (44°03'-123°11')	380	3690J3	Eugene 4 mi.	2	2,500	80		Bevan's Flying Service, Eugene, Oregon
Hitchcock (Pvt. field) (44°19'-121°32')	3,190	901	Sisters 1 mi.	2	3,800			M. G. Hitchcock, Sisters, Oregon
Madras Municipal (44°40'-121°08')	2,432	701	Madras 2.3 mi.	3	9,000	80	A & E	Everett Endicott, Madras, Oregon
Prineville Municipal (44°17'-120°54')	3,237	9-F-13	Prineville 2.9 mi.	2	3,700	80	A & E	Frank Stratton, Mgr., Prineville Airport, Prineville, Ore.
Roberts Field (Redmond Mun.) (44°15'-121°09')	3,064	235W 122J	Redmond 1.5 mi.	2	7,000	80-91	A & E	Richard Ballentine, Mgr., Roberts Field, Redmond, Oregon

Source: Oregon Airport Directory, Oregon State Board of Aeronautics.

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21—BEGINNER'S BOOK OF PHOTOGRAPHY (Wallace E. Dobbs). Designed for the beginning camera user. Discusses approach to landscapes, action shots, interiors, portraits. Explains use and operation of camera.

22—MANUAL OF CORRECT EXPOSURE (H. P. Rockwell, Jr., APSA). Comprehensive information on exposure meters, film speeds, negative sharpness. Helpful suggestions on proper exposure.

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27—PRESS PHOTOGRAPHY FOR THE FREELANCE (Kip Ross, ARPS). Covers all types of news pictures, flash technique, and markets. Contains hints for breaking into press work.

29—NEGATIVE RETOUCHING AND PRINT FINISHING (Ernest E. Draper and Norris Harkness, APSA). Shows ways of improving photographs after negatives have been developed. Explains print spotting, toning, staining, coloring, titling, making greeting cards, novelties, etc.

30—PHOTOGRAPHIC QUESTIONS AND ANSWERS A course in the principles of photography in question and answer form. Information on cameras, lenses, shutters, focusing, types of film, print making, trouble-shooting, albums.

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32—COMMERCIAL PHOTOGRAPHY (Victor Keppler). An overall picture of commercial photography as a vocation. Includes working with models, photography for illustration, industrial work, equipment required.

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34—HOME-BUILT PHOTO EQUIPMENT (Walter Burton). Complete instructions for the building and use of home photo equipment such as printers, enlargers, tripods, floodlights, safelights, etc.

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Eberstadt Report

(*Continued from page 41*)

and consistent national policy objectives, the committee said.

"Disturbing inadequacies" in our military intelligence system were noted. "Testimony was presented to the committee that in the spring of 1948, a mistaken intelligence agency stimulated recommendations which, if followed, might well have had serious consequences." (A later charge in connection with the report alleged that this was an Air Force intelligence estimate that the Soviets were preparing to move into Scandinavia last spring. The U. S. immediately prepared counter-moves until other intelligence groups evaluated the information more accurately.)

The committee criticized both services and President Truman for lack of liaison, arbitrary decisions, and failure to coordinate national policy. "The committee has noted instances of officers of relatively low rank adopting, in the course of staff planning, assumptions in regard to matters of the highest policy—matters which should be decided by no one less than the President acting on the advice of the National Security Council.

"The committee has also noted an opposite and perhaps no less dangerous tendency. The President's directive of July 26, 1948, placing a ceiling of $15 billion on the National Military Establishment Budget for fiscal year 1950 was apparently issued without the formal advice either of the Joint Chiefs of Staff (his principal military advisers) or of the National Security Council, whose statutory function it is to advise the President in regard to foreign and military policies."

"The history of the 70-Group Air Force program offers another example of these tendencies in operation. The program was adopted in the late spring of 1948, following the President's address of March 17, 1948, pointing to the suddenly increased gravity of the international situation as requiring an enlargement of the armed forces.

"When it became necessary to devise what in substance amounted to a new strategic plan on an emergency basis, the Joint Chiefs did not assign logistic responsibility to the Air Force; on the contrary, the Air Force presented its 70-Group program (which had been drawn up long before, under different international circumstances) to the Joint Chiefs, as representing its view of what its logistic responsibilities should be.

"The Joint Chiefs accepted the Air Force estimate, instead of imposing their own estimate on the Air Force. Through the intervention of the President and the Secretary of Defense, the Joint Chiefs accepted a reduction of the 70-Group program; in the end this reduction was cancelled by the Congress as the latter had a perfect right to do and may have been wise in doing. The result was, however, a case of a service program (that of the Air Force) making national policy rather than national policy being implemented by a service program."

The first year of operation of the unification act "was marred by certain conspicuous instances of disunity at the top levels of the military establishment," the committee declares. "These lend themselves to sensational exaggeration. They have been, and probably will continue to be, exploited by those opposed to the whole present organization. They will be advanced to support the contention that unification under the National Security Act of 1947 has proved to be a failure. With this contention the committee cannot agree."

The new office of the Secretary of Defense provides for the first time an authoritative military agency completely divorced from the particular interests, traditions, and backgrounds of the individual military departments. "No one familiar with the strong deep-seated interservice rivalries, grounded in traditions and stimulated by ambitions, expected them to fit easily into the new mold. But they are being fitted in, both in spirit and substance."

The committee says that real advances are being made toward integration in budgetary matters, public relations, legislative matters, education and training. The successful separation of the Army and the Air Force, the consolidation of the Air Force and Naval Air Transport systems in MATS, and joint educational facilities between Air Force and Navy air training are cited. Some Air Force officers have been checked out in aircraft carrier landings and take-offs and piloted Naval planes in recent Naval war games. Naval planes, likewise, have participated in [Air Force] demonstrations."

In a direct naming of names, unusual for an official document, the committee challenges Russia directly.

"There is a growing belief among responsible officials of Government that the Communist strategy in the struggle for the world is to force the United States into greater and greater expenditures of its resources for armaments, for economic aid and support to friendly nations, for lend-lease arms aid to Western Europe, for atomic energy development, and for other politico-military purposes. Victory by bankruptcy may be the Machiavellian aim of the Kremlin.

"Whether or not any such deliberate campaign can be attributed to Moscow, it is absolutely clear that the United States faces in the immediate future no period of calm and ease, no sudden relaxation of tension, but a continuation of recurrent crises—what Toynbee calls 'a time of trouble.'"

The committee urged that its recommendations should be carried out promptly. "And then," advises the report, "the organization should be given a breathing spell during which to strengthen its structure and perfect its operations." END

STRONG OBJECTIONS

The Eberstadt report was not acceptable in all circles. Air Force magazine, official journal of the Air Force Association, said:

". . . Several members of [the Eberstadt Committee] are also members of the Navy's old and powerful 'civilian arm' known as the Navy League. This includes the 'task force' chairman, Mr. Eberstadt, who, we understand, has recently been re-elected vice-president of the League.

". . . Eberstadt is the man who was chiefly responsible for framing the [Unification] Act in its present form.

". . . The idea of Mr. Eberstadt investigating Mr. Eberstadt and deciding that Mr. Eberstadt was basically right in the first place is hardly recommended jury procedure."

"Start 'er up. I think I've got it fixed now."

Dogfight

(*Continued from page* 43)

tails to them and they'd have come down on us in a dive and it would have been murder before we got to the clouds.

"We'd been hitting a lot of old stuff, suiciders, low and slow on the deck and we had been the ones with the advantage of speed and altitude. So we were sort of mentally conditioned to attack, I guess you'd say, and it didn't occur to anybody to run. We bored right on up and then they saw us. I saw them drop their belly tanks and here they came roaring down and we turned to get on their tails.

"They missed on their first pass and from then on down to the deck it was just a big wild, hairy dogfight, corkscrewing down and back up again. There's no way to tell it as one story for we were all split up then, and each of us went his way. It wasn't the way we were trained to try to dogfight 'em, but there was nothing else we could do. You couldn't find a man to join up on him because every place you looked there'd be a Jap. We were just diving and zooming and shooting every time one crossed our sights with our heads on swivels, and the Nips spinning on a dime and us yanking our noses up and down and left and right trying to get one in our sights for just a split second.

"Anyway, what happened to me was like this. When they missed in that first dive—and Lord knows why unless they were taken by surprise, I turned with the two that went past me and went into the cloud on their tail. We came out about 2,000 feet below and one had drifted off to the left and was going on down in a diving spiral with me above him and off a little to one side. He came out of his spiral and leveled off and started to roll, and just as he turned over on his back I gave him a quick squirt and he flamed.

"I went on down in my dive to about 10,000 hunting for Drake, for I knew with the Japs flying in sections of two, and sometimes divisions, it was no sky for a single *Corsair* who wanted to keep his health. But when I broke into the clear at 10,000 I didn't see Charley so I pulled back up to look for him and when I broke through again at 16,000 it was just like the playback of a movie scene.

"There were six of them waiting for me up there and when they saw me they flipped over in a dive. This time I made the mistake I didn't make the first time. I turned to dive back into the clouds below and just as I straightened out of my turn somebody hit me on the head with a baseball bat. It felt just like that, like somebody had hauled off and swung from Port Arthur and let me have one across the base of the skull about level with the ears.

"I went on down in an all-out dive with somebody playing 'The Bells of St. Mary' inside my skull, and broke out again, this time about 12,000. I circled around looking, while my head cleared up. I began to figure by now what had happened. One of the Japs had caught me with a 20-millimeter explosive bullet in the armor plate right back of my head and though the bullet didn't penetrate, when it exploded so close behind my head, the concussion addled me a little. I wasn't scratched though, except for a bruised place on the back of my head. About this time I saw Jerry and joined up with him and we reported back to Sleepytime who told us to come on home."

JERRY CONNORS SAID: "And they didn't have to tell me twice, either. Up till that time I wasn't so sure I was going to get home. They weren't coming in on me one at a time but two and three at once, right from the start. You see, I broke out a little behind Cy and Drake, when we spotted them, and the first thing I know as I started to the left in a steep climb trying to get on their tail, is these three making a section run on me. But they were too eager, for they over-led me. I saw their tracers scooting past my nose but I didn't feel good about that.

"I grabbed my mike and yelled loud as I could holler to anybody who could hear: 'Hey, get these——off me,' and instead of going in behind them I started looking for Al, my section leader, to join up on him. But about the time I saw him, here came two more boring in on me from 1 o'clock, one high, one about level. I was behind Al and a little below, and the *Zeke* that was level must have figured on turning in on Al's tail, leaving me for his mate up high. So he whipped into a steep turn right in front of me. He filled up my whole windshield and I shot quick, a good burst, and he broke out of his turn, burning, headed down. But I almost scored double that time, for my tracers were whizzing right past Al's wing up ahead.

"The fellow who came in high I didn't see. He either didn't fire or missed. So I started trying to pull up on Al but just as I started moving up, Al got sight of one and firewalled after him, pulling away. Which left me lonesome as a lost chicken again, and here came two more, level, one dead on and the other from about two o'clock.

"The one head on and I started firing together at about 700 feet and he suddenly pushed his nose down to go under and I pushed over too and that brought him right through the pattern of my tracers. I saw pieces of his canopy flying off and he was smoking as he went under. I was doing all right so far but I still wanted company so I kept on hunting Al. When I spotted him again he was in the damndest vertical ring-around-rosie you ever saw with a *Zeke* tying him in knots. It would have been like trying to join up with two cats chasing each other around a barrel to join up with him.

I hung up there until they came out of about the 50th whirl, it seemed to me, and the *Zeke* didn't pull up again this time. He just kept going in on his back, straight into the sea. Then I looked around for Al and he was just disappearing into a cloud, climbing, and I lit out after him.

"When I broke clear, there was a *Corsair* off to my left, when Al should have been off to my right, but I figured maybe he crossed in the cloud so I joined up. Then I saw it was Cy, with a big hole

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in his canopy, and his radio antenna all wrapped around his stabilizer. He looked like he might need help and the last time I saw Al he was doing all right, except his radio was out, so I fell in on Cy's wing and we came on home. I didn't know where Drake was, dead or what, but about that time he called up and said he was all fouled up. He couldn't see anybody from where he was and his compass was out and—"

CHARLEY DRAKE SAID: "You aren't kidding I was fouled up. To go back, though, what happened was, I lost Cy in the first tangle and as I was looking around for him these two *Zekes* whipped across my bow to the right. I took the inside one of the section and started firing, but I was too low in my seat and I couldn't use the gunsight. I was firing my tracers and was shooting astern of him. So I swung my nose a little and just walked them up his fuselage until they started going into his cockpit and he exploded, with chunks flying all around.

I started swiveling my head around looking for Cy and trying to jack my seat up higher when I saw four more *Zekes*, below. The two on the left were paying me no attention, but the two on the right were pulling up to make a run, so I went down on them, taking the inside man. He tried to turn and I got him right in the cockpit—a short burst this time because I could use my sight now. I pulled alongside him and looked in and his whole cockpit was a ball of fire that burned inside for a moment and then broke through.

"I pulled off and saw his mate falling away to the left and I came down on him beam on. It was a 90° deflection shot—I am proud of that shot—and as I pulled away in a big wing-over to the left he was burning in the cockpit just like the other. They must have had some sort of gas tanks in there just forward of the pilot.

"What I needed most, right then, was company and I started looking around for Al or Cy or Jerry or anybody I could find. Then I looked in the rear view mirror and turned a thousand years old. I had company and I don't mean maybe. Two *Zekes* were coming in on my tail, one from each side and brother, they really had me bracketed. I rammed the nose down and firewalled everything and goosed her with water and when I hit 8,000 feet, coming down from 15, I was indicating almost 500 miles an hour and was still building up.

"I saw the Japs break off at 7,000 and pull up. I figured if I had all that speed there was no need to waste it, so I hauled back on the stick and roared up in a big hairy climb. Now a *Zeke* can turn like a Shetland pony, but he can't dive and he can't zoom like a *Corsair*, and I came up from below them like a freight train overtaking a tramp. I got the inside one in my sights for just a second and poured about 200 rounds into him and he started to burn in the cockpit just like the others.

"His wingman went off to the left in a sharp turn and I kicked left rudder and had him cold. I pulled the trigger and the guns went 'brrpp'—maybe 100 rounds, and that was all. I was out of ammo. "I pulled up on him to the left and could see a little smoke coming from his wing roots, but not enough, I didn't figure to kill him and he was flying all right. I was looking right down on him. That meat ball was big as a bed sheet, and I thought, if you want to confirm this one, kid, you better ram him. Then I happened to think how far it was back home and I pulled off and let him go.

"It was a good thing I did. I turned for home. Then I glanced at my gauges and the compass was going round and round, pointing nowhere and my gas gauge was out and I had no engine temperature or anything else. And I didn't know whether I was headed home or not. So I started yelling for help and raised Jerry, flying with Cy somewhere, and they tried to give me a steer but without a compass I didn't know north from Tuesday.

"I came over this little island which I didn't recognize and started circling, low, at about 1,000, trying to get oriented, and I looked up and off to the right at about 5,000 there sat a *Zeke*. Well, I scrunched down in my seat and tried to look small as a seagull and put her down on the water until I could taste salt, just about, and got out of there. I looked back and up and he was turning away, and I knew I was safe for then. But which way was home?

"I pulled up a little and tried to look around and the first thing I know, high above me I see these babies coming down. I figure this time I am dead for sure, but then I see something that makes me yell for joy. These are low midwing planes, not low-wings like the *Zekes*. They are Army jokers, P-47s. So I wobble my wings like mad and jink up and down so they can see my crooked wings, and they pull out of their dive.

"I call them up and tell them my troubles and they say okay join up and they will take me home, and they finally did, thank God!

"I felt pretty good, with four kills for sure and one that might have gone in, and I knew Cy and Jerry were safe. But I was worried about Al, for the last time I saw him he was in this Maypole Dance with a *Zeke* and the *Zeke* was coming down on him and I figured maybe I should have gone over and tried to help Al out."

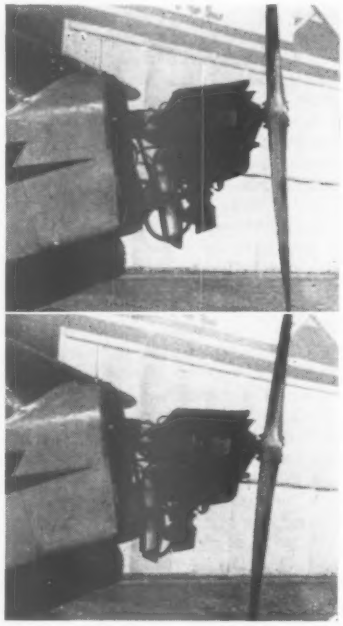
AL WELLS SAID: "I could have used you. I could have used you and the rest of the squadron and a couple of sawed off shotguns, for I never got into such a mess in my life, and why I got out of it as well as I did, I'm not quite sure.

"Like the others said, when we pulled up through the clouds the first time and they spotted us and started down in a dive, we held together for just a minute and then there were Japs everywhere, under us, over us, at both sides and cutting in front of us and behind. I don't know about the other guys but all I was doing was taking quick potshots, just whipping my nose around trying to hold one long enough to kill him and not getting anywhere with it.

"I was afraid to try to pull in on one's tail for I knew if I straightened out that long, one would get on my tail, or maybe two or three, but I saw I'd have to do something, or I'd be out of ammo with nothing to show for it. Finally this one came whipping right in front of my nose and I turned with him, firing, and got a pretty good hit. He smoked and started to go down, but I had pulled around so tight it had stalled me out and I went down too.

"We went into the cloud layer below and as I recovered from the stall we broke out of that layer into the clear and there he was below me, still going down.

MOVABLE ENGINE



WHEAT rancher John Tomaske of Prosser, Wash., has installed a movable engine mount on his J-3 *Cub*. The mount is operated by a control lever on the left side of the cabin and enables the pilot to tilt the engine (bottom) through a 15° angle to give considerable down thrust for take-offs and landings. The thrust line is brought back to normal (top) for level flight.

With this mount, the *Cub* has been flown as slow as 25 to 30 m.p.h. with good lateral and longitudinal control and can take off in approximately two-thirds the usual run with the engine down, Tomaske says.

The inventor intends to add a linkage between the movable mount and the longitudinal trim so that as the engine is lowered the plane will trim itself. Now, considerable back pressure is needed on the stick—even with the stabilizer all the way down—to keep the wing at a high angle of attack during take-off.

I fired again and he started really to burn this time—all aflame in the cockpit.

"The second chase brought me out below the lowest cloud layer, at about 8,000 and I started to climb back up to see if I could find the fight again. But just as I started into the clouds I saw this *Zeke*, a little below and about a quarter mile away. So I stayed in my turn and went after him and he saw me and headed for the deck in a steep dive, with me coming in right on his tail. I was giving it everything it would take, low blower, water injection—doing everything but waving my arms outside the cockpit like oars.

"I remember thinking as I closed to firing range 'Well, you poor simple knucklehead, it won't be long for you,' when all of a sudden, as if he were jerked on a string, that *Zeke* went straight up. I mean straight, like a rocket, 'zoooom.'

"I yanked back on the stick to follow, but a *Corsair* can't make a square turn like that and the first thing I knew, from about 1,500 feet above me, head on and going like a bullet, here he came down in a 60° dive, on his back. I could see his guns winking. I could see the empty brass cartridge cases falling out of his wings. I was going up at about 60° and he was coming down at the same angle and he passed 10 feet above me. It was the closest I had ever been to a Jap in the air before. It was the closest I ever want to be. But he was missing and I was missing. His bullets were passing right over my head and mine were whipping under his belly, under his back, rather, since he was flying upside down.

"I whipped over at the top of my climb and turned, and there below me, going straight away, was the *Zeke* again. So I lit out after him with everything jammed to the firewall again and just as I pulled in range—he did it again. Up and over and down on me, on his back, and I knew then I was in for something that would probably end very sadly for me. And we did it again, and again. And again.

"It was beginning to get ridiculous. It was like something we might have rehearsed together back in flight school. It was like a play, or one of those dreams that are almost nightmares. I thought to myself 'I wish I knew what frequency this cookie was on. I'd call him up and say, "Listen, buddy, leave us knock this thing off and go shoot at somebody else, huh?" '

"You know, always before, in air combat, it had been impersonal. It had been me against a plane, and you don't think of the man in that plane. But this was different. This was me against another man. And I was beginning to wonder if he wasn't the better man of the two.

"I had already figured out what one of us had to do, too, if we weren't going to keep on with that square dance forever. He had to nose down on me a little, to get me in his sights on the dive. Or I had to nose up a little, to get him. Either way, it was a hundred to one that that slight change in course would bring us together head on, prop-to-prop, and both of us would end up in little pieces of shark meat down there in the sea. But I had to do something. I was just about blacking out on every one of these steep dives and pull-ups, and I knew he was going to get me if we kept on this way. Seven times we had gone through that same routine—chase, climb, loop and dive. I said to myself, this time, get him or quit.

"It was the same old rat race, he went up and I went up on his tail. He flipped on his back about 1,500 feet above me and in he came. My tracers were sliding right under him. I flipped the nose up quick and saw them go in just for the minutest fraction of a second and I shoved the nose down again and he roared over.

"This time he was closer than before, so close I could see the red glow of the flames that had started burning in his cockpit. I turned and watched him go. He stayed on his back, straight as an arrow, right on down to the drink. He didn't explode. He just went in. There was a splash and some ripples and that was all. I didn't feel much elation about it, I felt, somehow, a little regret. I felt I wished I could have met the guy. He could really fly that airplane, and for a long, long time he had made a monkey out of me.

"I saw a lot of spots on the water, where planes had gone in and the gas and oil had spread. I figured two of them might be Cy and Jerry, or Drake, for my radio had been out and I hadn't heard from a soul. I was all right but I still didn't feel too good.

"I figured there wasn't much chance that the four of us could have gone into a tangle with all those Nips without some of us getting creamed. Then I went on back upstairs, to see if there was any fighting going on up there. But I couldn't find anybody, so I started to go on home alone.

"I had gone a way when I looked up and there were four *Corsairs* coming down on me in a big hairy run, peeling off right on my tail. I saw them come on down, and I couldn't call them. I could just sit there praying that the dopes would recognize me before they shot me down. They did. They broke away at about 2,000 feet. It was Joe Dillard's division, hurrying to get into the fight. Sleepytime had called them and they were tearing up the sky to get there. They were itching to get in the brawl.

"And they were pretty sore when I turned out not to be a *Zeke*. So I joined up with them and we went back and hunted all over the sky for an hour, but we didn't find anything else, so we finally came on home.

"It was a good fight, and something to remember. But the best of it was not the fighting, but walking into the Intelligence Quonset to give Tilly the word on what happened, and seeing old Cy and Jerry there. And hearing from them that Drake was safe with them and would be home as soon as the Army refueled him. That was the best part. That was as good a moment, I guess, as I have ever known." END

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Blizzard

(*Continued from page 17*)

four-state list of 21 dead.

For sheer daring and a real talent for flying, Herb Martens, owner of the Martens Flying Service of Julesburg, Colo., and his race with the stork constitute one of the best air rescue stories of the blizzard. Martens rescued an expectant mother, in labor since 10 p.m. the night before, from a snowbound car. "I was told of the emergency about 4 a.m.," Martens recalled. "I knew the landing would be difficult and therefore asked a doctor to accompany me—in the event our plane should be damaged in landing and not be able to take off. However, we had no great difficulty in either the landing or take-off. It was dark and we had to use our landing lights." Martens estimated that on rescue activities he flew his Cessna 170 a distance greater than coast to coast and averaged a landing every 40 miles.

Largest number of persons evacuated during the period immediately after the storm was the seven patients of the Army Air Force Hospital at Rapid City, S.D. When pipes froze and fuel ran out at the Air Force hospital, a C-47 was able to rescue the airmen.

Hundreds of lives were saved by volunteer pilots. Francis Schmidt of Hemingford was rushed by plane to an Alliance, Neb., hospital, where doctors were able to save his frost-bitten hands from amputation. Prompt treatment made possible by plane was the only thing that saved them.

These are but random incidents from the hundreds of missions. Life-saving errands were performed over and over again. Each incident had a different setting, a different plane and pilot, a different patient, but each demanded transportation which could have been furnished only with a lightplane.

Doctors were organized into medical groups to supply airborne service for isolated families. On one trip, Dr. John Cutler of Scottsbluff, piloted by Dillard, was flown to a farm north of Broadwater. He was then flown to the Marlott ranch south of Yoder, Wyo., where he delivered a baby. Dr. Robert Morgan of Alliance flew to attend a pneumonia patient at Marsland. An Alliance doctor was also flown to a sick baby north of Hemingford.

Even the cattle received medical attention. Dr. Joe Brandt was flown to a Wyoming ranch to treat cattle suffering from a vitamin deficiency due to lack of feed.

Although livestock losses in some areas ran as high as 50 per cent, the final figures would have been much higher had it not been for the modern hayride initiated by Air Force C-47's. Bales of hay were dropped to stranded cattle throughout the storm area. Men familiar with the areas to be covered rode as observers for the Air Force crews.

Flying ranchers were busy dropping cake feed to their stock and checking on animals in trouble. Jim Bletso of Luboc, Tex., ranged many miles checking on his sheep camps, strung from Big Springs to Kimball, Neb. He estimated his loss as high as 11,000 sheep, but said the losses would possibly have been 100 per cent had he not been able to direct stock rescue operations from his *Navion*.

Airlift operations throughout the stricken area seemed to grow like magic. Every pilot who had access to a plane demanded and quickly received an active role in some phase of "Operation Blizzard." Swarms of light aircraft buzzed in and out of airports on errands of mercy. Pilots made 80 square mile area searches and a farm-to-farm check. At each farm instructions for summoning aid were dropped. An appeal for old sparkplugs was made at Scottsbluff and within a half hour 600 were collected to be used for plummets to drop messages and inform farmers of distress signals to be used.

From the variety of distress signals seen from the air it was evident that the CAP and international distress signals are not known outside of the fraternity of pilots. In the North Platte area one blanket on the snow meant a need for food while two blankets was a request for medicine. Farmers and ranchers in the vicinity of Gordon were advised to stamp out huge X's in the snow, and another confused agency asked families needing assistance to mark the roof of their house with a large dark cross. Relief pilots debated the merits of asking a person needing medical aid to scamper around the roof of his house painting X's.

One flyer announced excitedly on return from a mission, "Fellows, I spotted some sheer, black lace garments on a line out north! Is that the sign for, '*I'm all right, but come on down to my house Baby?*"

Marooned cars were buzzed to determine whether anyone needed help, and to see if tracks disclosed that rescue had already been accomplished by ground rescue teams. Harry Marshall, Rapid City pilot, spotted some 200 snowbound motorists on the road to Wall, S.D. He then made a second flight to drop emergency supplies of bread and milk.

One of the first answers to distress calls for air drops was made by a C-47 from Lowry Field, Denver, Colo., attached to the 2151st rescue squadron. Food was dropped to 305 persons snowbound in a single tavern-service station at Rockport, Wyo. Blankets and food were also dropped to the passengers of the Union Pacific streamliner at Hillsdale, Wyo., one of the 27 trains marooned in Wyoming and Nebraska.

Emergency rations were flown from Denver to the Sioux Ordnance Depot to avert a possible food shortage at the isolated military installation northwest of Sidney. Seventy-five cases of "C" rations and 10 cases of canned milk were dropped. Aid for the Rapid City, S.D., Air Base, isolated by big drifts, was dispatched from Salina, Kan. The C-47 delivered 1,000 loaves of bread, six cases of baby milk and six cases of syrup.

A number of missions were flown by the Air Force to deliver medical supplies. Penicillin and insulin were parachuted to the athletic field in the center of Harrison. The drugs were needed to care for a number of influenza patients seriously ill, and for persons suffering from diabetes and needing insulin. Plasma was also parachuted at Gordon where the supply had dwindled dangerously low. Everett Hogan, manager and owner of the Mitchell Flying Service, also helped ease the critical situation at Gordon by flying in a 300 pound shipment of drugs.

In many instances it was possible for pilots to land their planes on wind-swept hills near the home of the needy family, thereby insuring the delivery against any loss by breakage. It was also possible for the pilot to carry back an accurate report of the future needs of the snowbound family. The maneuverability and slower speed of the personal plane made it possible to make pin point drops of deliveries with an amazingly small percentage of loss and breakage.

Number one on the buyer's guide for farmers surrounded by ocean-like waves of snow was baby food. Miss Patricia Frank, executive secretary of the Scottsbluff Red Cross unit, reported that over 300 food units were supplied by the Red Cross along with quantities of fuel oil. At Chadron, six planes were flying most of the daylight hours dropping emergency rations to stranded ranchers in the area, and at North Platte an Air Force helicopter augmented the services of volunteer pilots to bring relief.

Several unusual requests were made for air deliveries. A Lake Minitair man was dropped food for his 500 rabbits, and a sand hills rancher called Clinch Flying Service, North Platte, and roared, "Fly me out a couple fifths of whisky. Any old kind will do."

The large number of take-offs and landings off the small drifted emergency strips was accompanied by a surprising low number of accidents. Kenneth Smith, Scottsbluff, flying a PT-26 and Observer Bill McPherson were on a dropping mission when their plane hit a fence on attempted take-off. Two men were uninjured and remained at the ranch. At Chadron, Solly Luft, airport manager, nosed over a plane on take-off. The most serious injury was suffered by Matt Brennan who crashed his lightplane attempting to land on a highway south of Chadron.

The Air Force, backing up the initial efforts of private pilots, alerted a string of air bases from Montana to Colorado and Texas, and flew food, doctors and medicine to the stricken area with C-47s, C-82s and helicopters.

As the snows began to melt over the plains, and as trains, buses and automobiles started creeping along the highways, the pilots were able to take a rest. Airport operators returned to more routine chores of flight instruction and charter operations.

But at most airports in the blizzard area, a new interest in private flying was noted.

Said one Nebraska cattleman, just before buying a new plane:

"Next time, they won't have to drop any grub for me. I'll get it myself." END

The Mailbox

(*Continued from page 6*)

LONG-WINDED

The last three-quarters of "Curing Those Ups and Downs" [December FLYING] was an inexcusably long-winded way of saying, ". . . to keep a constant altitude, watch your altimeter and push forward or back on the stick as required."

After all, this is not news to anybody.

M. L. TUTTLE

Cranford, N. J.

WHAT HAPPENS?

To settle an argument, will you answer the following?

An airplane is flying straight and level at 60 m.p.h. indicated into a 60 m.p.h. headwind. Suddenly the wind stops. What, if anything, happens to the plane?

LEONARD V. HELTON

Shelbyville, Ill.

● To settle this argument and countless others on the same subject, FLYING asked Hy Sheridan to write "A Lesson in Relativity" which appears on page 35, of this issue.—ED.

THE STOPLIGHT

In Flat Spins [December FLYING], you stated that Merrill Field, Anchorage, Alaska, probably, is the only field with a stoplight to prevent airplane-automobile collisions.

The RAF field at the Rock of Gibraltar has a stoplight where a road passes directly across the field's only runway.

While in Gibraltar this summer with a NROTC summer cruise, I saw three of my friends almost decapitated when they nonchalantly ignored the light . . .

GLEN REEM

Harvard University
Cambridge, Mass.

Beg pardon, but there are two stoplights at Langley Field, Va.

The F-80 boys bring 'em in fast and low across both roadways.

IRA M. MAXEY, JR.

Richmond, Calif.

. . . At Fort Knox, Ky., a signal light stops traffic when planes are landing or taking off from Godman Field.

JOSEPH BARNES

Louisville, Ky.

STALL WARNING INDICATOR

. . . If students have plenty of practice in recovering from stalls, they'll never need to use a stall warning indicator.

WAYNE G. DODSON

Chicago, Ill.

● Leonard M. Greene, President of the Safe Flight Instrument Corp., has this to say: ". . . In 1947, according to the CAB, there were 11 times as many fatal stall accidents as fatal accidents caused by bad weather; 13 times as many as caused by engine failures and airframe failures combined; 14 times as many as caused by collision with other aircraft, and 87 times as many as caused by fire. In fact, stalls were a larger cause of fatal accidents than all other classified accidents combined!

"In 1947 there were no fatal stall accidents on the 4,000 airplanes equipped with our stall warning indicators, as compared to 24 fatal stall accidents on 4,000 similar airplanes that were not."—ED.

POSTSCRIPT TO OMNI CONTROVERSY

These two letters conclude a controversy which began more than a year ago in the pages of FLYING *concerning the CAA's omni-directional ranges. One of the critics of the omni-ranges is Dr. Luis Alvarez, Collier Trophy winner and professor of physics at the University of California, Berkeley. In an article in* FLYING *last June, Dr. Alvarez quoted Dr. David Luck, noted research engineer of RCA. Dr. Luck here replies to Dr. Alvarez, and the latter's answer is also printed.*

LIKE Mr. D. M. Stuart and Mr. Caporale, I have been disturbed by the anonymous article on omnidirectional ranges which appeared in the February, 1948, issue of FLYING. No end of writing could be done in refutation, but Mr. Stuart has already ably discussed a number of the points raised. Readers of the sort likely to be misled by the February article already have been misled by it, and will so remain whatever is said in reply. There thus seems little to be gained by further discussion on the original article, but the article by Dr. Luis W. Alvarez in the June issue does require some discussion.

After the very kind comments made in that article regarding my own part in the development of the omnidirectional range, it is quite painful to find that I must disagree with some of what Dr. Alvarez says and with many of its implications. Because of the great weight carried by statements from Dr. Alvarez, as a result of the major importance of his own contributions, it is undesirable that certain improper inferences which can be drawn from these statements should pass without comment.

It is not at all surprising that Dr. Alvarez, after successfully applying extreme directivity in such outstandingly accurate radar systems as MEW, GCA and Eagle, should feel that the high-directivity approach is always the best one to follow. Neither is it too surprising that he should be less familiar with systems ideally based on infinitesimal antenna arrays, and should so fail to recognize Mr. Stuart's references to the well known octantal errors of direction finders, which increase with antenna spacing.

After two brief paragraphs which quite properly point out the complexity of the question "Is 'Omni' Best for Aviation?", though without mentioning the extreme importance of the factor of *present availability*, Dr. Alvarez devotes his discussion almost entirely to the single factor of accuracy of indication, developing at length the thesis that devices much more accurate than present omnidirectional ranges can be made. Since no well-informed worker in the field doubts the correctness of this thesis for a moment, the basis for argu-

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ment is somewhat obscure.

The contention that solutions to the problem of navigation not reached along one particular path must be basically unsound seems to me, however, to be at best a bit shaky. Careful use of the term "law" in its accepted scientific sense hardly permits any statement that actual, operating equipment "violates a basic law of physics," so such statements seem to me to require no refutation.

The rule stated as "the maximum angular errors in a system equal 57°, divided by the overall size of the antenna system in wave lengths" is incomplete and so must be handled with considerable care. Mr. Stuart has given one good example of the absurdities implicit in its too-literal application, with his d-f loop with a 19000° error.

As to cases where the rule indicates small errors, I have seen a 120° error given by a beacon radar for which this rule allows only a 6° error—there was in that case a strong reflection from an engine nacelle. I prefer the safer statement: "The maximum error that can be encountered in the determination of azimuth is ± 180°." This is true independently of antenna size or anything else, and circumstances can usually be concocted for any given system under which it is significant.

The statement that the present omnidirectional range is obsolete implies to me either that the type of service it can render is no longer desired, or that some alternative device better suited to render a similar service is presently available. I cannot accept either of these implications. The existence of techniques from which more accurate devices can obviously be developed does indeed suggest that ODR obsolescence may be rapid.

Obsolescence from this cause will not be a certainty, however, until the practical need for and suitability of such more accurate devices is clearly demonstrated. The automobile at first offered no advantage but speed over earlier automotive devices of the hayburning type. The initial success of the airplane showed clearly that still faster devices could be developed, and that obsolescence of the automobile might therefore be rapid. Nevertheless, it is fortunate that application of the automobile was not withheld pending development of a fully satisfactory personal aircraft.

Other things being equal, pin-point accuracy is desirable in any navigational aid, but other things usually are not equal. When the user must decide just how much he is willing to pay in weight, complexity, inconvenience, delayed availability and just plain money to obtain extreme accuracy, he may well decide that he will not pay so very much. Each aircraft must be allotted a certain minimum airspace for safety in emergency maneuvers, and once the linear error of position fixes from a navigation aid has been made less than the size of this safety space, there is clearly little to be gained by further increase of accuracy. The final answer as to optimum accuracy is not yet known, and one may well be satisfied to meet, with a comfortable margin of safety, specifications arrived at by such groups as ICAO and RTCA. Those who have flown most on present omnidirectional ranges seem to consider them capable of doing this.

Use of large antennas and sharp beams would undoubtedly reduce, though it would not eliminate, the chance of errors due to reflecting objects, and would relieve some technical requirements on design and adjustment of equipment as well. This method of attack was not used when work on the ODR was started in 1936, because the only practicable method then seen for rotating a sharp beam uniformly through 360° was mechanical rotation of a wide antenna. This was quite out of the question at the 150-foot wave length then in use. So far as I know, mechanical antenna rotation is *still* the only practical way to rotate a sharp beam through 360°, but war-time development of extreme short-wave operation makes this more workable now as a basis for future development, as Dr. Alvarez has quite properly pointed out.

Being very slow, mechanical rotation would require an entirely different approach to the problem of smoothing the indications, such as the holding circuit suggested by Dr. Alvarez, and determination of the relative merits of this and the present ODR smoothing method would require comparison of design and performance of complete indicators. It seems entirely possible that a successor to the present ODR will indeed develop in such fashion as to use sharper beams and slower data transmission.

Azimuth indication and distance indication are not competitive but complementary, as is made evident by their outstandingly useful cooperation in the PPI radar display. It therefore seems unconstructive to debate the relative merits of the two types of data for sole use, though with both DME and ODR available either alone would serve in case of emergency. We may earnestly hope that light, simple DME equipment, suitable for use in small private aircraft, will be developed as time goes on. A computer is needed whether two ODR signals, three DME signals, or one ODR and one DME are used for position fixing.

The virtue of the ODR-DME combination is that it leads to an outstandingly simple form of computer. The output of the computer may be considered as providing position fixes in either a polar or a rectangular coordinate system that may be moved about and rotated at will, which is often much more convenient than a fixed co-ordinate grid of either polar or rectangular type. So long as he is kept informed of the direction and distance to his destination, it is of little concern to the pilot whether his coordinate system is polar or rectangular.

The question at issue seems to me to be really "Is 'Omni' Best for Aviation *Now?*" Even if development of an improved azimuth-determining facility were very actively begun today, the pace of peace-time development, testing, design, production, and installation is such, to say nothing of delays caused by controversies like this one, as to make it very unlikely that the new facility could be in routine operational use before 1955 at the earliest.

Are we then to continue to rely primarily on the 1930-style four-course ranges until some such time as that? The position taken by the AOPA on omnidirectional ranges shows that private flyers probably are willing so to continue, but other users of the airways definitely require a more flexible aid at an earlier date. In analogy, we could have had imperfect but very useful instrument-approach aids in wide use long ago, if there had not been a perennial campaign to wait for something better before doing anything. A comprehensive and widely accepted plan for development and installation of radio aids, recently promulgated by the Radio Technical Commission for Aeronautics, definitely calls for replacement of present omnidirectional ranges by an improved facility in 1962.

Static-free radio, both for communication and navigation, is absolutely essential to the advancement of aviation. It is not always recognized that most of the airborne cost and weight generally charged up to ODR buys only static-free radio. Condensation of VHF receiver and ODR converter into a single unit is highly desirable, but obscures the fact that most of the unit is a very necessary radio receiver. The penalty paid for adding, in simple form, a convenient and versatile navigational facility is appreciable but, at the same time, far from prohibitive.

Azimuth-indicating aids to navigation are basically sound, and will be particularly useful in conjunction with distance-indicating aids. Present omnidirectional ranges do use physically sound principles to determine direction, as is evidenced by long and successful use of the same principles in land-, sea-, and air-based direction finders and in four-course ranges. These new ranges provide information of practically useful accuracy in a convenient way, require relatively simple extra airborne equipment, and are available *now*. Their eventual replacement by improved devices operating at ultra-high frequen-

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cies is already expected and even tentatively scheduled.

The different operating principles advocated by Dr. Alvarez can be used in the future devices if, as is likely, they prove advantageous for such use. The question: "Is 'Omni' Best for Aviation Now?" is a complex one, requiring a practical compromise among many factors to determine its answer, but it seems to me that the answer must be "Yes."

—David G. C. Luck
Research Engineer
Radio Corporation of America

DR. ALVAREZ REPLIES:

I AM HAPPY to have the opportunity to reply to Dr. Luck's letter on the omni-range. To clear the decks, I should quote the third paragraph of my June Flying article. "For other reasons, the omni may be the best system for the present, *in spite of* its technical shortcomings. But it should *not* be argued that it is being installed *because* of its technical excellence." This quotation comes immediately after the introductory statements of which Dr. Luck approves, and effectively constitutes my opening remark on the subject. We would be in essential agreement if the words, "may be" were replaced by "is." I am content that they be so changed, since to me, the rest of the quotation expresses my really firm convictions on the matter.

I can find no disagreement between Dr. Luck and myself so serious that it could not be ironed out to our mutual satisfaction in a few minutes of conversation. We respect each other's views on technical matters of opinion, and agree on the basic facts pertaining to radio navigation. The reason we appear to be in conflict is that we have *different* points to make, neither of which has any bearing on the other. I readily admit Dr. Luck's point that omni is best now, and he apparently agrees with mine, saying, ". . . no well-informed worker . . . doubts the correctness of this thesis for a moment. . . ."

Since Dr. Luck uses an analogy about automobiles and planes to put his point across, let me use one about airplane engines to make my point, which I repeat is not in conflict with his. If in December 1941, all our planes had been powered by *Liberty* engines, we would have had to fight the first few years with them. They would have been "best now." No one could argue then that we wait out the war for three years until we built high class engines of a type known to other countries. That, I believe, is Dr. Luck's point in analogy.

But on the other hand, no one could object if the deficiencies of the *Liberty* engine were pointed out for the nontechnical public to see. (That was the primary function of my article and in it I concentrated on documenting my reasons for believing the omni to be an inferior device.) The public would be entitled to know that we were stuck with an obsolete engine, just as we are now stuck with an obsolete navigational aid. That is my point in analogy.

If those responsible for the decision to concentrate on *Liberty* engines kept insisting that they were really very superior articles, one might reasonably feel that they were trying to gloss over a bad policy decision made several years earlier. That is how I feel about the omni. It is the only thing available in quantity now, and so is unfortunately "best now." But that is only because the decision was made to ignore the superb aids developed during the war—and concentrate on the prewar omni.

At the end of the war, the British Gee System, and the American radar beacons were giving, in my opinion, better service under operational conditions than the omni ever will. That we don't have either of them in quantity, or any one of several other comparable aids, is the direct result of a policy decision made at the end of the war. Although nothing can be done now to alter that old decision, the flying public should be made aware of the consequences of such a decision.

It is most reassuring to me that a new Air Navigation Development Board has recently been established to chart the systems of the future. I hope and believe that with the sad story of the omni policy before them, they will come to sounder decisions than otherwise might have been made.

—Luis W. Alvarez
Radiation Laboratory
University of California

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